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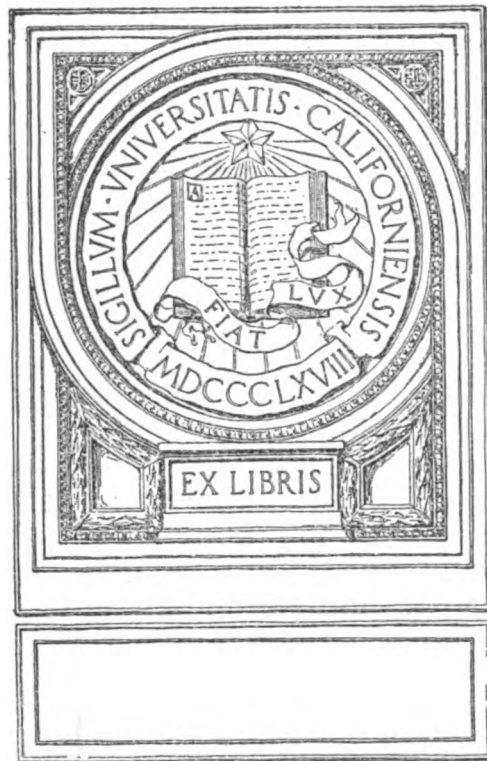
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MOTOR TRUCK

THE NATIONAL AUTHORITY OF POWER HAULAGE

Vol. XIII.

PAWTUCKET, R. I., JANUARY, 1922

No. 1

New Transport Line Fits Every Need!

**Now—A Complete Line of Specialized Trucks
for Every Service—at Lowest Prices**

Model 15, Rapid Transport, fast one-ton speed job, equipped with pneumatic tires, electric lights and starter, seat, windshield, fenders and running boards **\$1295**

Model 25, 1½-ton, complete with electric lights, bumper, radiator guards, hubodometer and motometer **\$1495**

Model 35, 2-ton capacity, equipped with radius rods, drive-shaft brake,

four-speed transmission, and electric lights, bumper, hubodometer and motometer **\$1885**

Model 55, 3-ton capacity (same equipment as Model 35) **\$2385**

Model 60, 3½-ton capacity (same equipment as Model 35) **\$2585**

Model 75, 5-ton capacity (same equipment as Model 35) **\$3485**

Transport's 1922 models are products of the combined talent of specialists—every part made in a factory specially equipped for its manufacture—by men specially trained—and co-ordinated into the finished product in Transport's exclusive truck factory—by Transport workmanship, the superiority of which is shown in every phase of construction. These trucks are all made of new, clean stock and priced on the basis of present costs. Note the wealth of up-to-the-minute equipment which these prices include.

DEALERS: With big activities calling for more trucks every month, this is the most profitable opportunity ever offered you. The growth of Transport business is one of the wonders of truckdom, Transport dealers will tell you. The capacities, construction and equipment specifications and prices tell you much, though only a part of the value of a Transport distributing franchise. A Transport representative will call on you any time on request

Transport Truck Company, Mount Pleasant, Michigan

TRANSPORT

INTERNAL GEAR



DRIVE TRUCKS

A New Power Hoist



Columbian Motor-Motive Hoist \$260.00

The Ultimate in Power Hoists

For years a large division of the Columbian Organization has been engaged in the scientific designing and building of Truck Equipment including the famous Partition Mounted, Three Point Supported Truck Tank, Monometallic Dump Body and Lightning Hand Hoist. The demand on this division for a real power hoist became so insistent that Columbian Engineers set to work.

Today—the result of their ingenuity—the Columbian Motor-Motive Hoist has successfully completed more than 18 months of the severest tests applicable. Truck operators who observed the test hoists in operation literally besieged our power hoist plant before it was in production—before the tests were completed.

THE Motor-Motive Hoist is the ultimate in power hoists. Its action is direct and positive. Its performance is not dependent on any inconstant third agent. The power of the motor is transmitted direct from transmission take-off or propeller shaft to lifting cables through clutch-controlled bronze worm and bull gear—the cables winding concentrically over bull gear drum effecting ever increasing elevation speed and

ever decreasing descent speed. A two-way, combination disc and cone-clutch operating on the worm shaft controls elevation and descent and in neutral holds the body at any stage of the elevation. Elevates to maximum dumping angle. Dumps clean. Worm runs in oil. All bearings thrust ball or roller type. Pressed steel frame. Grit-tight housing. Weighs only 400 lbs. complete. Lifting capacity 10 tons. Mounts in 15 inch space. Dumps in less than 30 seconds.

*Now in Production. Write, wire or telephone for Bulletin No. A59C
Describe take-off arrangement of your truck.*

COLUMBIAN STEEL TANK COMPANY

INCORPORATED IN KANSAS



KANSAS CITY, MO.

The
Epitome of
Simplicity
Compactness
Efficiency
Durability
Economy

Sales & Service DISTRIBUTORS

Notice—A few territories are open for live-wire distributors equipped to render mounting service and maintain stock. Address Manager Dept. 606.



VOL. XIII. NO. 1.

PAWTUCKET, R. I.

JANUARY, 1922.

Motor Truck Service Builds Big Warehouse Business

Widened Delivery Radius Brings Increased Clientele to Indianapolis Concern Which Has Had Phenomenal Growth Since Installing Fleet of Commercial Vehicles.

THE Central Public Warehouse Co., 108-114 South Alabama street, Indianapolis, Ind., conducts a general merchandise, haulage, warehousing, transferring and trucking business in the city of Indianapolis, delivering incoming freight and express to about 450 customers scattered throughout the city and collecting outgoing freight, shipping it by the steam and electric rail lines to other sections of the country. During the year a vast amount of freight is handled by this com-

pany and the 12 Standard trucks which form the fleet are kept busy practically all of the time. All kinds of merchandise is handled, with the exception of ice and coal, which the company makes no attempt to haul.

Previous to 1915 the business was conducted with a single warehouse and five horse-drawn teams. The horses, however, proved inefficient and on Jan. 1, 1915, a two-ton Standard truck was purchased, followed, on Oct. 17, 1916, by a second two-ton Standard.

OTHER trucks of the same make were added until at present the fleet numbers 12, all of Standard manufacture, including seven two-ton, three 2½-ton and two 3½-ton.

The manner in which the trucks have been purchased well illustrates the phenomenal growth of the company and the vast amount of freight which is handled through the six present warehouses yearly. Asked why the

motor trucks were used to the exclusion of horses, Mr. J. C. Strohm, the president and general manager of the company, replied

that horses were too uncertain and too slow; that the business as conducted today requires prompt service and a positive method of delivery, which is gained only by the use of motor trucks.

Goods are stored in the warehouses for the local customers of the company as well as for out-of-town concerns, a feature which proves



All Trucks Used by the Central Public Warehouse Are Governed to 18 Miles an Hour—Overloading Is Positively Prohibited at All Times.

547299



Body Equipment Is Standardized Throughout the Fleet, Consisting of Platforms of Good Width with Staked and Slatted Sides.

profitable and very popular, as they are allowed the privilege of storing surplus goods in the warehouses at a nominal figure, enabling them to take advantage of market conditions and to have the goods on hand when needed. This feature enables the merchandising customers to carry larger stocks of goods without the necessity of building or owning storehouses of their own with its consequent heavy investment.

The officers of the Central Public Warehouse Co. consist of J. C. Strohm, who is president of the company, acting also as general manager with the duties of routing the trucks for transfer work about the city and the office details of warehouses one, two, three, four and six. H. W. Strohm, secretary of the company, is also assistant general manager, having charge of the truck checking, unloading at the warehouses and handling all complaints. B. A. Strohm holds the position of treasurer, having general charge of the transportation department, and is also the purchasing agent of the company.

Platform Bodies Used.

The body equipment of the 12 trucks is all of similar construction, viz., platform bodies of good width, equipped with stake and slatted sides, this special type of body having been found best adapted for the kind of loads hauled by the company. Each truck is equipped with a driver's cab and a tarpaulin cover that is thrown over the load in case of storms.

As most of the trips are short, the

day's mileage averages about 40 miles for each of the 12 trucks in use and as the territory travelled is mostly over city streets which are in good condition, overloading is permissible which, during the number of years that the trucks have been used, does not apparently show that overloading to an excess of five tons has harmed them.

Overspeeding is not tolerated. The engines are governed to 18 miles an hour and the drivers have strict orders not to tamper with the governors in any way. Poor drivers are not employed, only the best available are used and these are kept satisfied by paying them well, giving Saturday afternoons off, with 9½ hours constituting a day's work. All mechanical troubles are referred by the drivers to a mechanical repairer in the fleet garage.

The company also has been considering the plan of giving a bonus

to the drivers who show the best results with their trucks and in this way work for efficiency. This manner of handling employees has so far worked to the benefit of the company the drivers staying on the job and not caring to make a change.

Oiling and greasing are attended to by the drivers, as this plan has been found more advantageous than having the repair man attend to this duty.

Cost of Operating Trucks.

An advantage enjoyed by the Central Public Warehouse Co. is that the trucks are never at any great distance from the repair shop, so that if slight adjustments are necessary no great amount of time is lost in making them or repairs of a minor nature.

The highways over which they operate are naturally of the best and, as they are not allowed to operate faster than 18 miles an hour, ordinary truck troubles are not encountered, with the result that repair expenses are very low. The general manager figures that this item alone does not run over \$5 a month, not including tires. Covering the seven-year period, through which the trucks have been operated, the up-keep is considered very small.

Figures compiled by the company show that it costs to operate a two-ton truck, including oil, gasoline, driver, services of the garage repairer and all other items of operation, with the exception of tires, \$132.30 a

(Continued on Page 53.)



No Wonder He Smiles—Good Pay, a Bonus and Saturday Afternoons Off, All Help to Make Truck Driving a Pleasant and Profitable Occupation.

Haul Heavy Machinery

Fifteen and 20-Ton Fruehauf Trailers Specially Designed for Rugged Service Are Claimed to Save Surface of Highway Through Method of Weight Distribution.

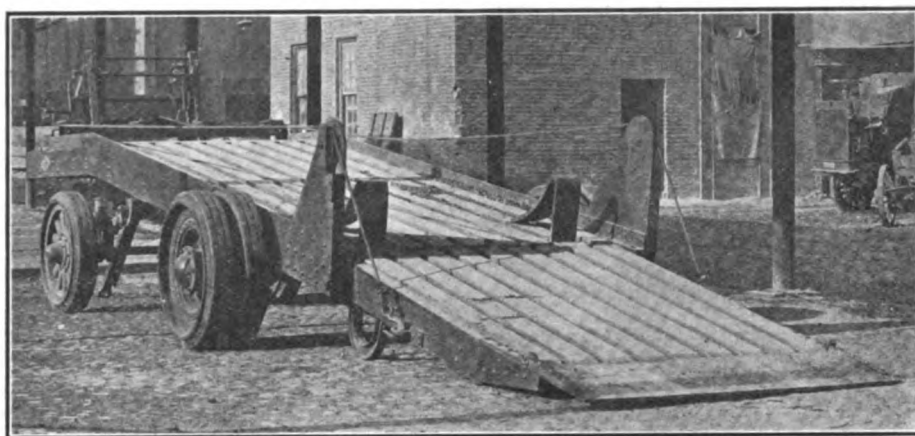
THE Fruehauf Trailer Co., Detroit, Mich., states that it is now in production on a new type of motor truck trailer especially designed for hauling steam rollers, heavy machinery and safes. It has always been more or less of a problem to move heavy machinery by motor truck, due to the fact that the load would naturally be too high in the air for the average truck. The Fruehauf Trailer Co. recently developed a low-frame, four-wheeled trailer which is claimed to solve this problem. This trailer has the platform sloping towards the rear and is fitted with a tail gate that drops down, which acts as a run way or skid to move up heavy machinery.

SEWELL cushion wheels are used on the trailer at the rear to relieve it of road shocks. The platform of the trailer is 34 inches high and, with the tail gate down, a steam roller, it is claimed, is able to mount the platform under its own power.

The trailer shown in the illustration was recently sold to the city of Detroit for the asphalt department, and is to be used for hauling steam rollers from one job to another about the city.

The specifications of the new 15-ton, four-wheeled trailer are as follows:

Length, 19 feet, 10 inches; width, 72 inches inside measure; frame, eight-inch channel, reinforced with three by four-inch angle iron; floor,



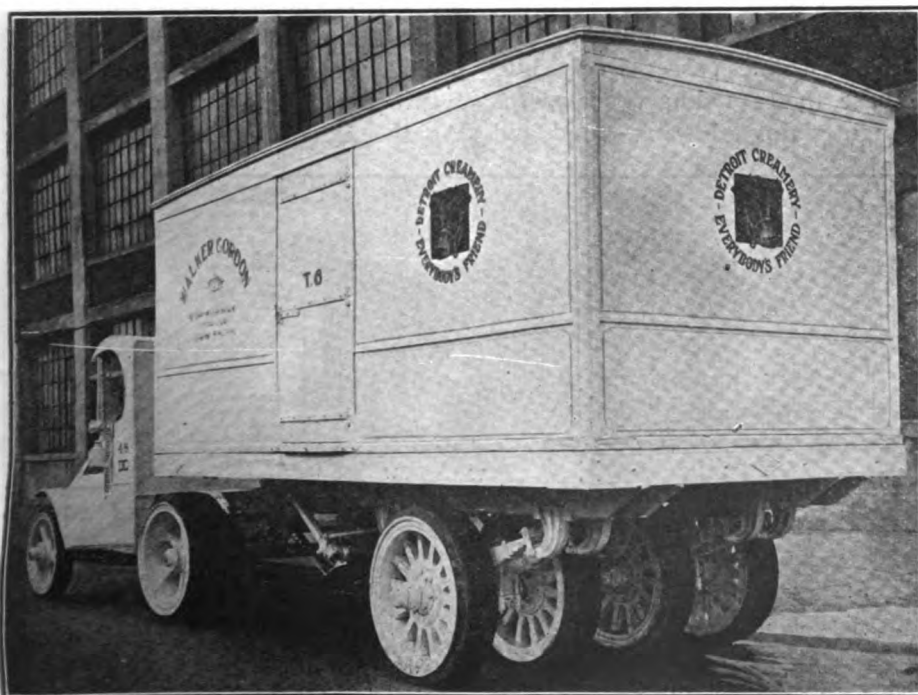
This Rugged Fruehauf Trailer Is Capable of Handling a Steam Roller with Ease. The Inclined Runway Makes Loading a Very Simple Matter.

steel plate, with wood floor strips to prevent roller from slipping; body, 19 feet eight inches by 72 inches, with tail gate to drop down and act as a runway to drive up heavy ma-

chinery. (The tail gate is too heavy to operate by hand and is moved by a cable and windlass located at the front of the trailer.) Wheels, 36 by 12-inch, Sewell cushion rear, 36 by seven-inch front; tires, 36 by seven-inch dual rear, 36 by seven-inch single front; axle, 5½-inch round fitted with Timken bearings in rear and 2½-inch round fitted with Timken bearings in front axle; springs, 42 by three-inch, 14 leaves front, dead axle in rear, no springs; steering, one-end circle steer; windlass, Klemm, three-ton capacity; width overall from hub to hub, approximately 106 inches.

Another recent development of this company is a remarkable trailer which is claimed to be of great assistance in saving the roads where heavy loads are carried. This is of the semi-trailer type, having four wheels mounted at the rear, side by side, instead of the conventional two wheels as usually furnished.

This idea makes possible the distribution of the load over more
(Continued on Page 44.)



Four Wheels at the Back Distribute the Load of This Heavy Trailer in Such Manner as to Be Beneficial to the Highway, It Is Claimed.

The Why of the Engine Cylinders

This Article Mentions Briefly the Various Types in Use—the Function and Principle Common to All—Detailing Proper Method of Service.

ENGINE cylinders are necessary in the automobile, truck or tractor engine to provide a means for compressing and firing the gas mixture. The action of the gasoline engine cylinders and pistons may be compared to two tin cans, one inside of the other, with the bottom end of the smaller can fitting next to the inner

bottom of the larger can. Placing an explosive mixture between the two can bottoms, and by some outside method causing the mixture to ignite, causes the smaller can to be driven out of the larger with considerable force. This well illustrates the principle on which the piston and cylinder of modern gasoline engine works.

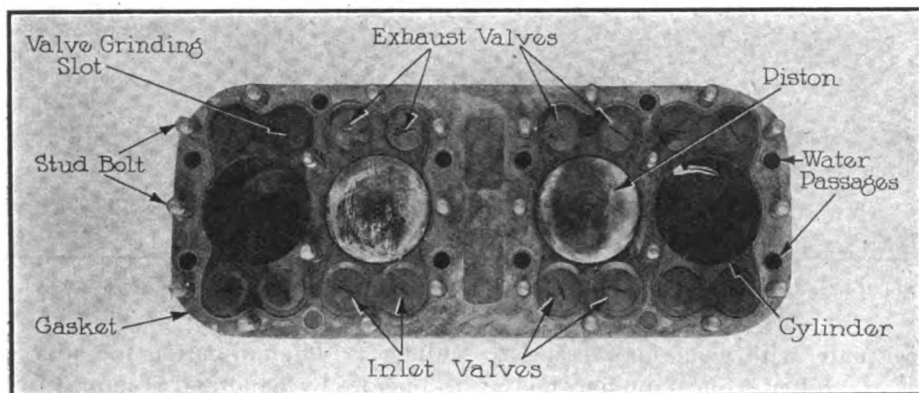
THE piston takes the place of the smaller can, while the cylinder, with its smooth walls and enclosed upper ends, takes the place of the larger can. To prevent loss

they are the cause should be found and remedied. Slight scores in the walls are not particularly harmful and, if the cause is removed, they are not liable to grow worse. But

the oil from the engine reservoir works upward through the grooves, fouling the spark plugs and depositing carbon on the heads of the pistons and the surrounding surface of the combustion chambers.

Types of Cylinders in Use.

Engine cylinders are usually cast from gray iron, a metal considered superior for the lower-priced line of cars. Heavy duty truck and tractor engine cylinders are made of semi-steel, a material which works easily, takes on a good finish and is not susceptible to the alternating temperature of cold and heat. A few engines have been constructed for experimental purposes and a few have been tried out in passenger cars which have had the cylinders cast from an aluminum alloy. The results, it is claimed, were equally as good as when cast-iron or semi-steel cylinders were used and the engine was considerably lighter in weight. As the expansion of aluminum is

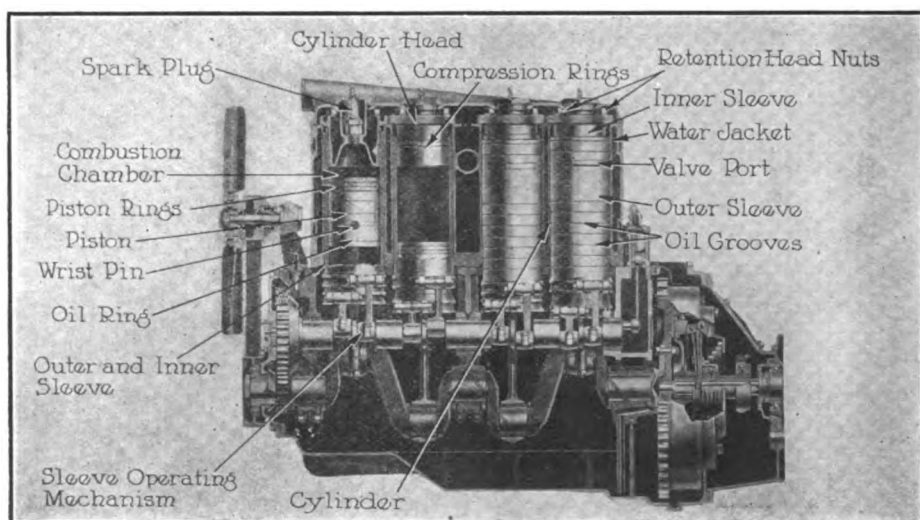


Cylinder Casting of 16-Valve Stutz Engine—This Is a T-Head Type Using Two Inlet and Two Exhaust Valves to Each Cylinder.

from the exploding mixture the cast iron rings in the slots in the piston must fit closely the wall of the cylinder. This necessitates careful fitting at the factory or at the hands of the repairer whenever new rings are installed. The same rule also applies to making the wall of the cylinder smooth at the factory and keeping it smooth while in use. Anything which scores the wall, such as a broken ring, loose wrist pin, or foreign material which enters the combustion chamber, works down between the wall and piston rings and will cause scores in the metal, which will allow the compressed vapor of the exploded charge to be forced by and to lose its effect on the piston head.

At the first indication of a scratching sound in the engine cylinder the walls should be examined to note if they are becoming scratched and if

if the cause is not removed the grooves gradually deepen, causing channels through which the unburned gasoline passes freely into the base, the exploding vapor passes through, giving a hissing sound, and



The Willys-Knight Engine Is a Sliding Sleeve Type Admitting Gas to the Cylinders Through Corresponding Ports in the Sleeves.

about twice as great as cast iron or semi-steel, provision is made for this important detail in the design of the aluminum cylinders and no difficulties with piston sticking are encountered.

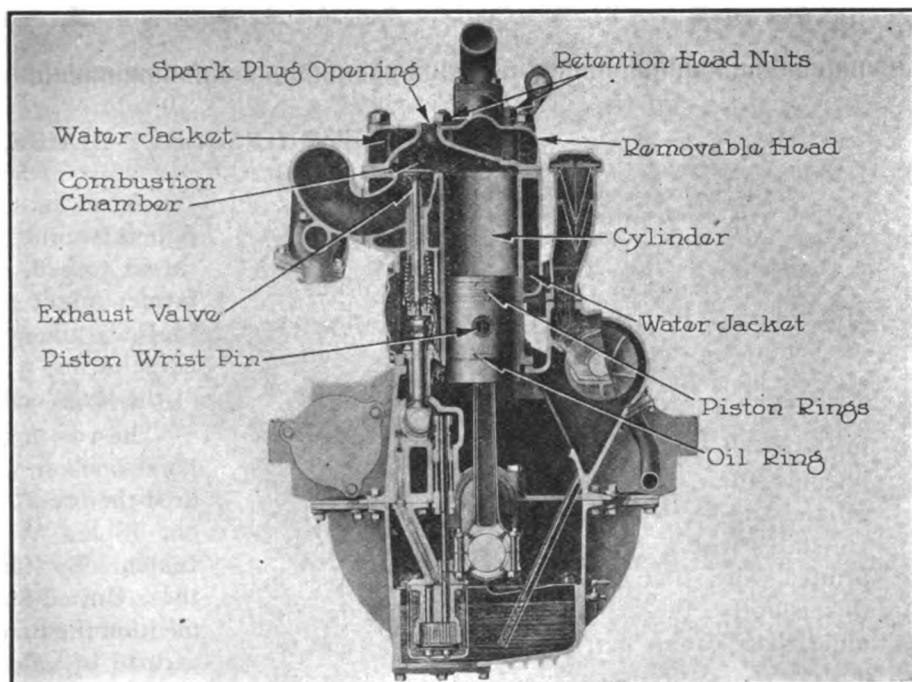
The cylinders in present-day engines are usually cast en bloc; that is, the four cylinders are cast in one piece. Original four-cylinder engines often had the cylinders cast separate especially if the engine bore was of good size. This type eventually gave way to the cast-in-pair type, which in many instances is still in use. Many of the heavy-duty truck and tractor engines have their cylinders cast en bloc, integral with the upper half of the crank case, this method being used to simplify the number of parts and to lower the cost of manufacture. This type of cylinder casting is made possible by the use of semi-steel as it allows a greater range of casting and simplifies assembling.

Cylinder heads are divided into five individual classes, based on the type of valve mechanism used. Early engines were of T-head construction with the inlet valve at one side and the exhaust valve located opposite on the other side. This permitted large valves and large-diameter cylinders. For many years this type of engine was used both in passenger cars and trucks and it did not give way until an increasing demand for lighter weight engines, capable of giving high speed for sustained periods and economy, were demand-

ed by the public.

This type of engine was used largely on high-priced cars and heavy-duty trucks where the cost of

burned gas. Cylinders of this type are commonly cast en bloc while many of the earlier L-head cylinders were cast in pairs. A few of

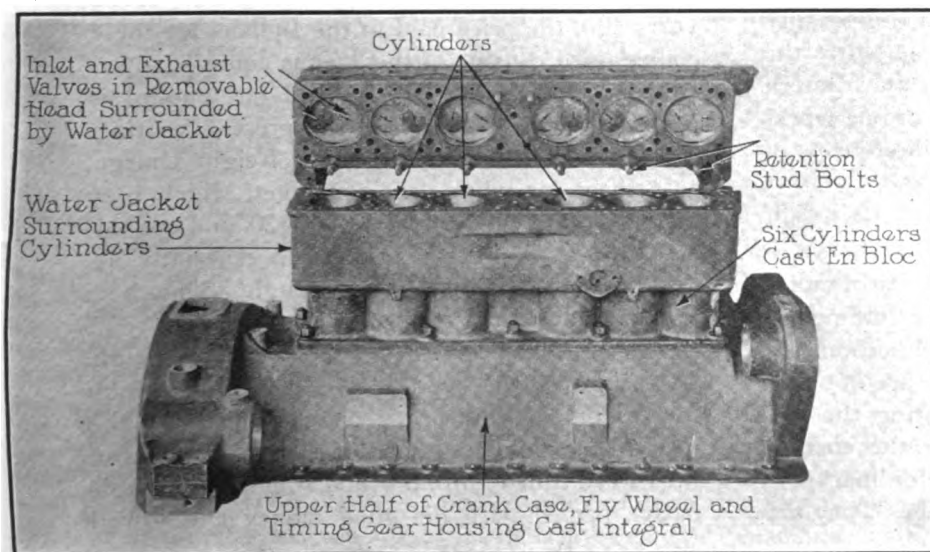


Typical L-Head Engine Cylinder Showing Units of Cylinder and Their Relation to Each Other; Is Commonly Used in Trucks.

operation did not figure to such an extent as it does at present. On account of their weight, which was excessive, the cylinders were cast in pairs. The L-head, a second type, is used largely today in small engines of popular low-priced cars. In this engine the valves, both inlet and exhaust, are located at one side of the engine block with separate manifold openings cast in the head which admit fresh gas to the combustion chamber and take away the

the early L-head manufacturers cast these cylinders in separate units, assembling them in a row on the upper half of the crank case. They are now practically obsolete, because of the possibility of poor alignment and the higher cost of casting and assembling.

The I-head type or valve-in-head cylinder, as it is often called, was developed originally by one of the prominent passenger car manufacturers in the early days of automobiles for use in the two-cylinder passenger cars manufactured by the company. Later in 1908 the engine was redesigned into a four-cylinder, vertical type, with the inlet and exhaust valves both located with the valve mechanism on the cylinder head. The claim made for this design of engine was, that greater economy of operation was possible, that it developed greater power for the number of cubic inches of piston displacement and that it occupied less space in the car chassis. Of late this type of engine has become very popular and it is being widely adopted by other car and truck manufacturers to supply power for their



Valve-in-Head Cylinder Cast En Bloc Showing Head Removed and Location of Valves in Recesses in the Head—A Popular Type.

(Continued on Page 47.)

TRUCK TALK

CALLING THE WHIPSOCKET BLUFF.

"Little he Knew of Book, Truth, or Creed.
A well sharpened pencil sufficed his need—"
—from the Horse Boosters' Bible.

ADD to the list of "things we have with us always," the genius of distorted mathematical bent who, tongue in cheek supplies reams of alleged facts anent the "increase of horses" in these United States. It isn't human—this listening to a self-exalted bunk dispenser without calling his bluff, so let's attack him on his own ground and see what kind of a comeback he has. He states with dignified authority gained by the printed word, that there are 19,000,000 horses in this country, these figures also including the mule, that "equine first cousin who hopes not for posterity." More than 17,000,000 of these animals are "on farms," states the horse-booster, the rest being in the towns and cities.

This statement may be true enough if taken literally. A thorough analysis, however, will show that it conceals rather than exploits the real truth.

Fooling with figures is dangerous, as many an alimony payer can testify, but we'll accept the chance cheerfully. The horse-booster wants us to stop at the testimony given by his statistics, but since we are familiar with his shady method of computation we'll just trace these animals to their home pastures (the horses—not the boosters).

Let's take the Atlantic coast states first. Not an average of one horse to a farm in this locality—to say nothing of the mule. Same with the Southern states, Middle Atlantic states, Western states, in fact there isn't an average of one **working horse** or **mule** on the several million farms of this great nation.

Now—admitting that the horse booster hasn't been too careless with his cyphers—where are these animals? That's easy. **The majority of mules are on mule ranches—farms that raise nothing but mules, and the State of Missouri will account for the great proportion of them. They are not productive—not working; simply awaiting the call of the auctioneer—and, considering the cost of the feed used in their preparation for market—they're selling at an awfully low price. They are**

"on farms" truly enough, but not in the way the figures would have us believe—since they are raised to sell, quite as another, more aesthetic farmer might raise tulips. And now if we turn to Iowa and a few adjacent states we find the horse farms, which also account for a proportion of the large census.

The two foregoing sources of comfort to the horse-booster will perhaps allow for a few hundred thousands of the animals listed in the boosters' Bible. Where then are the other millions? **Listen. By far the vast majority of horses in these United States are WILD. This writer can mention the time and place of sale, of carload after carload of wild stock that was sold for years throughout the central and middle western states—and probably is being sold today. He knows where there are hundreds of thousands of these "horses" right at this minute, and by a little manouvering among the Blackfeet Indians (unless times have changed radically), could guarantee you the price and delivery date of as many car loads as you might be willing to purchase—which incidentally, would be none, if you happened to be acquainted with the animal. Wild as hawks, thin as a "Shoten" herring, weighing anywhere from 500 to 900 pounds, these horses (by courtesy) are more like wolves than anything equine.**

At the time I was specifically acquainted with certain horse traders, which was about seven years ago, the price paid to the Indians for these choice third cousins of the "**genus equus**" ranged from 50 cents a head to \$3, and the amount is probably little changed at the present writing. The traders, after paying a big freight charge, sold them for what they could get, which may have been anywhere from \$12 to \$20, and considered that they got top price if an especially attractive one (by comparison) brought so much as a dollar more than that.

Little those "horses" knew of saddle or bridle—a bag over the eyes, a rider who "sat" them for a moment while they were clamped by the neck to the saddle pommel of a tame horse—and they were called "broke"—and some unconscious native parted with his good money and towed

home a kicking, biting, refractory cross between the Son of Hate and a charge of dynamite. (I always suspected that these animals were crossed with the Rocky Mountain goat, but never could prove it.) * * * * *

Yes, Mr. Horse-booster, there are probably 17,000,000 horses and mules "on farms" in this country, if one may dignify the Indian lands by that classification, and your census no doubt is correct enough if it is intended to take in all kinds and conditions of horseflesh—but if you mean working horses and mules—drop off a few cyphers; they'll come in handy in compiling next year's whipsocket census.

By the way, speaking of that latter reminds us of the "2,000,000 horses in towns and cities." There are a lot of towns and cities in this great country, you know, but here's a personal experience that will serve as an argument. Three months ago I chanced to be spending a few days in a small town on Cape Cod. I called on an old friend who formerly ran a livery stable and feed store. "How about a horse for a day or two," I asked in jest.

"Haven't had one for three years," he laughed.

"Where can I get one?"

"Well," he answered, chewing hard on his fine-cut, "If you want a 'hoss,' (which I know you don't,) the only one in this town is across the street"—pointing to a carpenter's shop! "No others hereabouts nowadays." And it was even as he said.

Furthermore, you may not believe it, but I found a 19-year-old boy in that town who had never seen a side-car buggy in his life. He thought that the whiffletree was a bush—grew in the Everglades of Florida, he said. Or was it some kind of a bird? He didn't know. Whipsockets? Never heard of them; no such accessory on the truck he drove. Yes, much against our will, we are forced to believe that "figures don't lie, but, etc., etc., etc."

ROADS AT \$53,000 A MILE.

A STRIKING illustration of the cost of modern concrete highways for heavy motor traffic is seen in the recent announcement of bids offered by the Pennsylvania State Highway department for the construction of about 60 miles of road. The total low bid for the entire work approximated \$3,200,000, or \$53,333 a mile. Low bids submitted for 31.7 miles of 18-foot reinforced concrete pavement totalled \$1,735,314, or \$54,000 a mile. On 21.7 miles of 16-foot reinforced concrete road, the bids averaged \$45,000 per mile.

"The total highway mileage for Pennsylvania, as given in a recent classification by Thomas H. MacDonald, chief of the United States Bureau of Public Roads, is 81,556 miles, of which 3300 miles, or 3.6 per cent., constitutes the state highway system. The state highway department has available from different sources \$80,000,000 for the state system. At the rate of \$54,000 a mile, should the department extend its policy of building 18-foot reinforced concrete to the entire mileage, it is estimated that the state highway system would cost \$178,200,000. At the rate of \$45,000 a mile for 16-foot reinforced concrete the 3300 miles would cost \$148,500,000."

The foregoing which appears in a contemporary publication is ostensibly written from the view point of the reporter, and is supposed to be journalistic rather than editorial in its inception, but even the casual reader must recognize the implied meaning. The real truth of the matter is that concrete roads are low-priced. The more they cost the less they cost. Paradoxical?? Yes, but easily understood. The concrete road needs no attention. It is done when it is finished. No up-keep. Few repairs and 100 per cent. efficiency. Don't be misled by the hired ad writer who operates in the cloak of a reporter.

R. E. M. COWIE TALKS ON TRUCKS.

R. E. M. COWIE, vice president, American Railway Express Co., in a recent statement says: "The value of the motor vehicle as a means of transportation cannot be over-estimated; the things that it has accomplished even thus far are marvelous in the extreme. From an experience of a great many years, with all types of transportation, I have come to the conclusion that there is very much of a distinct place for the motor vehicle, either propelled by electricity or by gasoline.

"Until a few years ago the express traffic of the country was conducted very largely by horses and wagons, which are regarded in these days as a slow and tedious means of transport. It is very unfortunate that horse-drawn vehicles and motor vehicles have to operate on the same highways, because the horse-drawn vehicle is very apt to keep the speed of the traffic strained back, recognizing the theory that the speed of your fleet is the speed of the slowest collier in your fleet."

Mr. Cowie is an authority. He knows what he is talking about. His statements must be taken as authentic; facts, comprehensive and far reaching, and the result of actual experience, than which there is no greater teacher.

Brings Drug Store to Farm House

United Drug Company, with Fleet of Nine White Trucks, Covers Entire State of Indiana in Serving Rural Users of Rexall Goods.

TO BORROW from the vernacular, C. M. Cubbison reached for his mortar and pestle. "Now," he reasoned, "the first ingredient must be quality goods. Then service is absolutely essential. These two bases, thoroughly ground with a few crystals of salesmanship and personality, ought to produce a tonic which, if properly applied, cannot fail to build up business among

the farmers." The vision was not as grotesque as it sounded for, divested of all chimera and applied to the practical realm of merchandising—in which Mr. Cubbison functions as head of the home service department of the United Drug Co. of Boston—it still retained the germ idea of a business in quality goods, built on the firm foundation of service.

SO MR. CUBBISON prepared to put the idea to the test. He promptly proceeded to formulate a definite plan of execution and then set out to extend the influence of the

our project was worth trying at all, it was worth doing right, which in this case meant it was 'worth doing White.'

In the beginning the White trucks

Rexall home service and Rexall products.

Coffee Basis of Business.

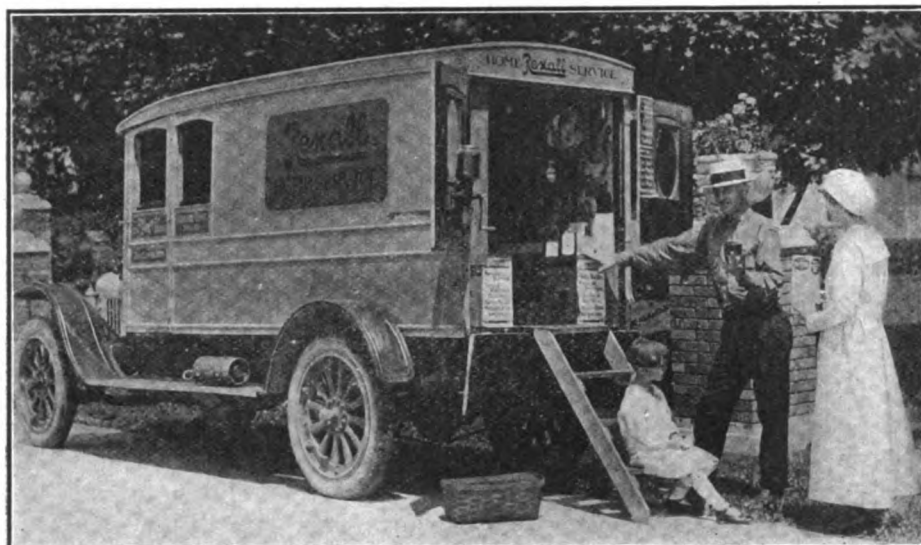
"Our plan is this: We arrange to place five pounds of excellent quality coffee in each home every four weeks. Coffee, because of its universal use, is thus the entree to the home. If at the end of four weeks all the coffee left on the last visit has not been consumed, our salesman takes back what is left over and leaves five pounds of fresh coffee. Thus we are both doing the customer a service and giving our representative a chance to engage the interest of the housewife.

"Inviting the prospective customer out to the truck, the driver next shows her Rexall pharmaceuticals, remedies, toilet articles, rubber goods, stationery, sundries, brushes, food products, candy and what not. Perhaps she orders something, perhaps not, but we have at least made a bid for her interest. Orders are taken for delivery the next time around that particular route and cards are left, addressed to the Rexall store in town, so that if the customer thinks of anything she wants, between trips to her home, she can drop an order in the mail box and have it delivered on the next visit of the Rexall home service man.

Visits Made Regularly.

"Moreover, we supply stickers which, pasted over the proper dates on the calendar, become constant reminders to housewives of the date of the next visit of the Rexall man. So, instead of peddling, or bobbing up at irregular intervals like huck-

(Continued on Page 44.)



Compare This Travelling Drug Store with the Old Days When the Farmer Had to Drive 10 Miles for a Bottle of Pain-Killer.

Rexall dealer and of Rexall products now sold exclusively in more than 10,000 drug stores in the United States and Canada—to the farm home.

The State of Indiana, with its numerous farms comparatively close together and its network of good country roads, was selected for the test.

"We started out by purchasing a fleet of nine motor trucks, all White ¾-ton jobs," explained Mr. Cubbison. "At first we hesitated at the White price, but as we were attempting to introduce a quality line of goods, we could not consistently do so with any but an acknowledged quality truck. We decided that if

were assigned: Two to Fort Wayne and one each to Anderson, Lebanon, Huntington, Wabash, Logansport, South Bend and Frankfort. The territory which each truck serves is generally the county. First the county is plotted out into 20 sections, each embracing approximately 60 homes. Each section constitutes a route, to be visited on a specified day every fourth week.

"When we start out we have three things to offer the farmer," declared Mr. Cubbison. The first is quality merchandise. The second is service. The third is the personality of our salesmen. The homes in the sections are, first, prospects, then customers, and eventually friends of

Ruggles Two-Tonner Merits Approval

Newest Product of Well-Known Maker, Weighing Less Than 4000 Pounds, Is Especially Designed and Built to Stand Strain of Overload.

THE Ruggles Motor Truck Co., of Saginaw, Mich., has followed its one-ton truck with a sturdy two-tonner, which the maker asserts will maintain the same relative position in its field that is maintained by the one-ton model in its class. The new Ruggles model weighs only 3950 pounds, but is strongly built to stand up under overloading and the strain of constant heavy haulage. Powered with a 38-horsepower engine it will carry maximum pay loads and negotiate hills and bad roads without strain. In this truck the maker seeks to embody the features of a high-priced transportation unit while keeping its price at a figure that will popularize it. The Ruggles designers sought to meet the demands of most buyers who now insist that a truck should be sightly as well as serviceable. It is fitted with crown fenders, a handsome black radiator and hood, flush-mounted lamps and other features that add distinction.

THE chassis and wheels are painted a dignified Ruggles gray. The cab is gray and unless otherwise specified by the buyer the bodies furnished by the company are finished in gray with blue striping. The maker contends that when a business man invests in a truck he is entitled to more than just transportation facilities for his merchandise—he should get all possible advertising value out of his truck. This can be secured by giving him a vehicle the appearance of which will invite favorable comment and will be a credit to the buyer and his business.

The Ruggles Co. uses its own engine for this job—a four-cylinder en bloc L-head with detachable cylinder head. Its four-inch bore and five-inch stroke delivers 38 horsepower at 1600 revolutions per minute, giving ample power without high speed. It has a three-point suspension mounting and a three-bearing crank shaft made of drop-forged,

heat-treated, vanadium alloy steel. Cooling is secured by a centrifugal pump and by water jackets extending the full length of the cylinder barrels. A submerged gear pump driven by a spiral gear from the cam shaft secures full pressured lubrication through the drilled crank shaft to the main and connecting rod bearings.

The connecting rods themselves are vanadium-alloy steel I-beam sections, drop-forged and heat-treated. All the wearing parts are provided with bronze bushings. Present-day gasoline conditions are met by a hot-spot manifold that insures thorough carburetion. The rear axle is designed to meet the pulling strain of overloads. It is a double reduction axle with the final reduction in the differential. All unnecessary wear is eliminated through this type of construction. The Ruggles axle is equipped with an air-tight housing that protects all the working parts from dirt, water and all harm-

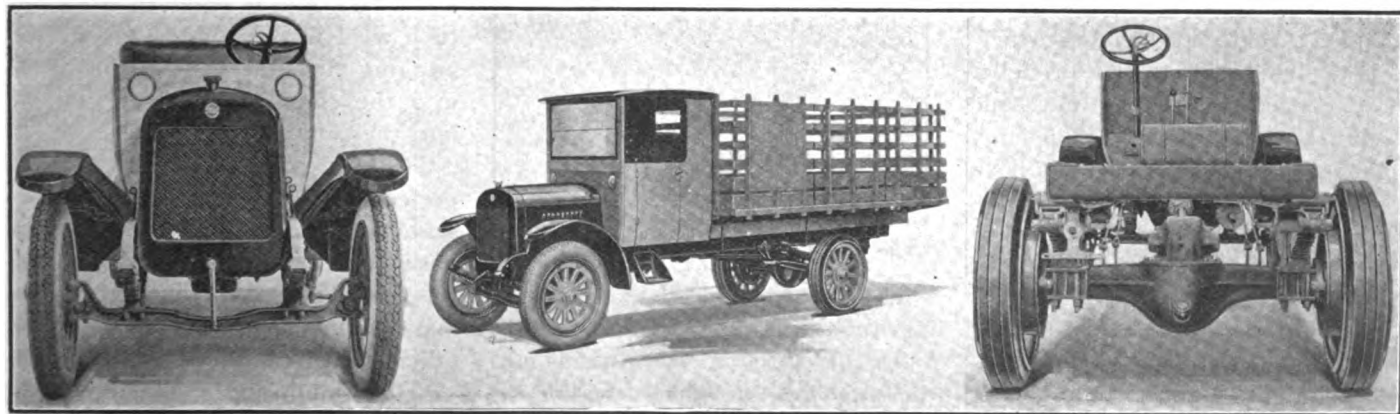
ful substances. The differential gears and bearings are full size and mounted in a single assembly.

Standard Construction Units.

Standard units of proven reliability have been adopted for the other parts of the Ruggles truck. It has a Stromberg carburetor; Alemite high-tension pressure grease lubrication system; Brown-Lipe multiple dry-disc clutch; tubular propeller drive shaft with three enclosed Spicer universal joints; Bosch high-tension magneto ignition; Jacox worm and split nut type irreversible steering gear; Brown-Lipe sliding selective type transmission, four speeds forward and one reverse.

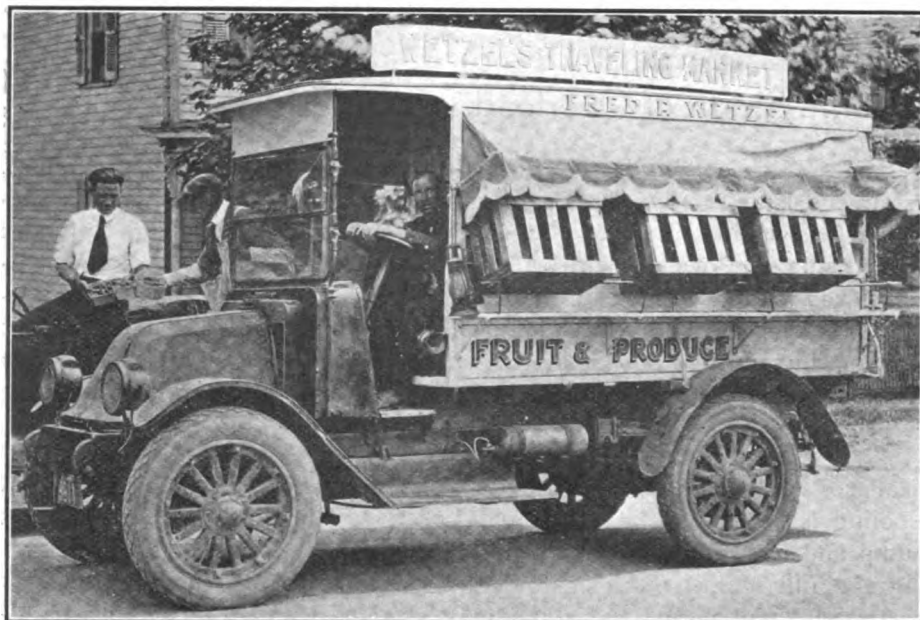
The standard tire equipment is 34 by five non-skid cords in front and 34 by four solid in rear. Where all-pneumatic equipment is desired the recommended sizes are, front, 36 by six, rear, 40 by eight. The standard wheelbase is 148 inches and the long wheelbase, delivered as

(Continued on Page 44.)



Rugged Appearance and Good Proportions Characterize the Newest Ruggles Product—Those Who Have Seen This Latest Addition to an Honorable Line Are Loud in Their Praise of It—A Specially Designed Engine Is Used.

Travelling Market Gets Business



Buying is as important as selling in the produce business—this marketman has successfully solved both problems with his truck.

CITY motorists with a desire for fresh eggs, tender chickens, crisp vegetables and other prime food stuffs, which seem to taste twice as good when purchased from the farmer at his own front gate, are

likely soon to find their trade being handled in a business-like way by travelling markets which give all that the farmer can and in addition are out on the road every day with their reputations and profits depending upon the quality and price of their products. This is a new kind of business which Wetzel's Traveling Market, mounted on an International motor truck, is developing over the roads between Bridgeton and Atlantic City, N. J. Motorists and other farmless and gardenless ones are coming to know him and farmers with commodities for sale look for him regularly.

A net work of such markets all over the country will undoubtedly come in time, disposing of the supplies of fresh food products usually wasted and putting the town and city in direct touch with the man who grows the produce.

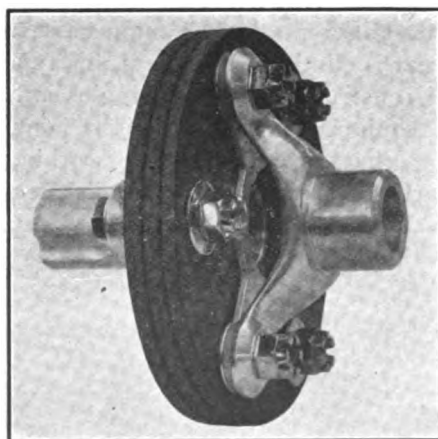
Arvac Manufacturing Co. Announces Expansion

THE Arvac Manufacturing Co. of Anderson, Ind., announces the addition of the Arvac disc joint to the already well-established line of metal universal joints which it has manufactured for five years.

THE new disc joint will be made in three sizes, intended to cover the entire passenger car, speed wagon and light truck field, and a large percentage of heavier truck installations between the clutch and transmission. As shown in the accompanying illustration, the design includes a centering member which, it is claimed, keeps the propeller shaft concentric at all times, and minimizes vibration by supporting the metal parts of the joint in a positive manner, causing them to revolve about a true axis—all of which tends to greatly increase the life of the discs.

The center member consists of a centering ring carrying a non-metallic, sound deadening, oilless, replaceable bushing supported by three radial arms which securely

lock it in a concentric position on the flange spider bolts. The centering shaft is pressed into the tubular spider and has a spherical surface, providing for both angular and longitudinal movements.



The Arvac Disc Type Universal Joint.

The cupped washers that grip the fabric have no sharp cutting edges and no irregular surfaces to cut into the outer layers of the fabric and set up disintegration. It is claimed that the concave-convex form of the

washer not only makes it possible to secure the same gripping area with a small washer diameter, thereby reducing internal friction by increasing the distance for flexing between the washers, but also permits the driving by abutment without resorting to special discs, which are undesirable from the service standpoint.

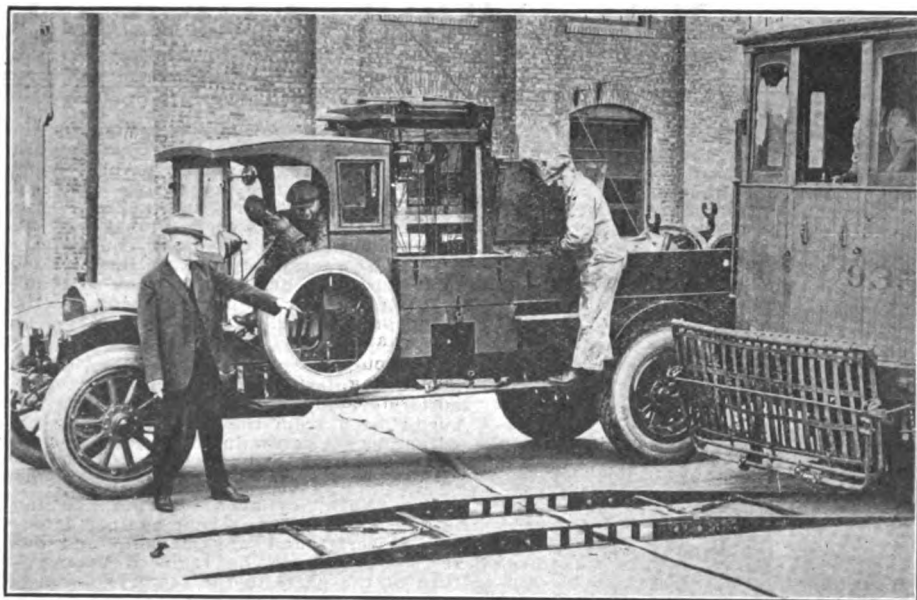
The flange spider hubs are all turned to S. A. E. standard dimensions to remove excess weight. The torsional strain is removed from the tube weld by a patented process of swaging the tube back of the weld into the slots or key ways milled into the tubular spider hubs.

The entire design, which has been perfected after 18 months of research, development and testing, is based upon the long experience of the Arvac Manufacturing Co. in the manufacture and application of metallic universal joints and upon a very thorough and exhaustive commercial survey which included all passenger car and truck builders.

An Ally of the Street Railway

"PINCH-HITTING" for the street railway in Los Angeles, Cal., is the specialty of the two-ton White truck shown here laying a temporary bridge over an obstructing length of fire hose.

THIS prevents a pile-up of cars on either side of the hose. Another feat which the White is frequently called upon to perform is the replacement of derailed cars. This it does by coupling on to stranded cars with a heavy log chain and towing the cars back to their tracks. The truck is also equipped with a three-section telescope tower designed to facilitate the repair of overhead wires. Other paraphernalia include blocks, tackle, picks, shovels and jacks.



This Truck Aids in Laying a Temporary Bridge Over an Obstructing Length of Fire Hose to Permit Street Cars to Pass.

Motor Trucks and Highways

REGISTRATION fees have already been fixed in several states which almost prohibit use of the heavier trucks. The Bureau of Public Roads, in its recent annual report, says that the problem of the heavy motor truck is one of prime importance, pressing each year with more weight for solution which, while not to be hastily solved, ultimately must be met squarely and disposed of. It further says that whether the operation of the heavier vehicles shall be restricted to a class of roads especially designed to accommodate them, or whether all roads shall be strengthened to provide for unrestricted use, or whether the third alternative shall be adopted and the operation of the heavier trucks be prohibited, will depend upon the relation which is found to exist between reduced operating cost and increased cost of construction, states the report.

"THE situation presents an economic problem of the first importance," it adds, "which is not to be hastily solved, but which must nevertheless be met. To do so demands a careful weighing of the effects of the several possible solu-

tions with a view to the selection of that one which in the long run will serve best to accomplish the one desirable end—the improvement of our means of transportation.

"The prime importance of an accurate knowledge of the weights of the vehicles which are to use the roads constructed is well illustrated by the experience of one of the states in which the Bureau of Public Roads made an extensive investigation during the past year. Ten years ago this state set out upon the construction of a system of roads. The roads were designed and built to meet all the reasonable demands of the traffic which then could be foreseen. In the brief time which has elapsed roads have been constructed which penetrate to all parts of the state, some of which, however, have been seriously damaged by heavy motor vehicles, the use of which could not have been foreseen when the roads were constructed.

"Our investigation reveals that in this case the return from the roads in the reduction in the cost of transportation and in the development of the territory

they traverse has undoubtedly compensated for the loss resulting from their destruction, but it is not by any means certain that the outcome will be so fortunate under other conditions.

"For the security of the enormous investment which is being made by the states and federal government it is imperative that this question of the duty which the roads will be called upon to render in the future shall be definitely determined.

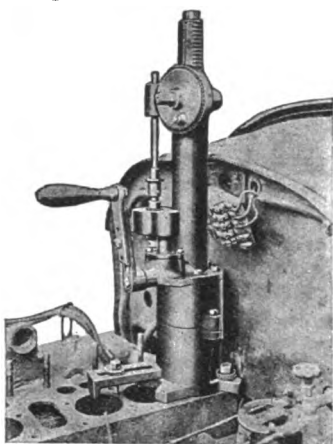
A clearer conception of the relative economy of heavy and light vehicles can be gained by careful study.

"The reduced unit cost of operation which follows from the transportation of commodities in greater bulk tends to promote the development and use of vehicles of the largest capacity which can be used to advantage. It is desirable to gain this advantage, if it is actually an advantage, but it is this point which is seriously in doubt. The doubt arises from the fact that the roads which are adequate for traffic of automobiles and light trucks are entirely unable to support the weight of the heavier trucks, and to build roads which will carry the heavy

(Continued on Page 40.)

New Motor Truck Accessories

The "York" Cylinder Boring Machine, a portable machine tool, is designed to rebores cylinders which have worn out of round or scored cylinders, and will successfully handle, its manufacturer claims, all passenger car, truck or tractor engines



within its capacity, $2\frac{1}{4}$ to $5\frac{1}{16}$ inches. The machine is packed complete in a neat oak chest and includes hand and power drive attachment, the latter which may be used with the ordinary electric drill found in the service station.

Two feeds are provided, the fast speed advancing the boring bar .072 inch per revolution and the slow speed advancing the boring bar .030 inch per revolution. Providing a smooth, continuous feed of the boring bar as the bor-

change transmission gears mounted on the gear drive shaft. These gears are driven by the same double bevel driving pinion which turns the boring bar, and mesh with a pair of gears keyed to the lead of feed shaft with a sliding key. A worm mounted on the upper end of this feed shaft operates through a large worm and spur gear driving the rack and advancing the boring bar in keeping with the change gears.

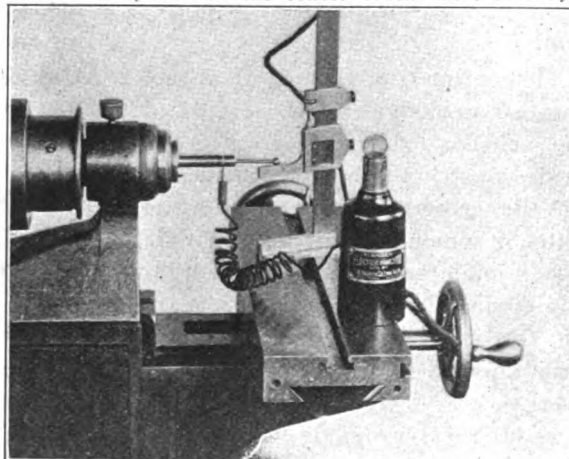
The cutting head is fitted with six non-chattering, "York" process cutters, which are self-centering and self-piloting. The cutters are adjusted without removing the cutter head from the bar by turning an adjusting set screw in the adjusting cone which expands all of the cutters uniformly.

The "York" cylinder reboring machine is guaranteed for one year against defective material and workmanship and defective parts will be replaced upon return of the parts to the factory.

Sold by the Winterknight Equipment Co., 1327 Race Street, Philadelphia, Pa. Prices and literature on request.

The Hansen Electrocauter is a new precision instrument combining mechanical ingenuity and electrical science in one instrument for the purpose of locating points with extreme accuracy, with but little effort or skill on the part of the operator, and in a fraction of the time usually employed in former methods.

The instrument assures the operator the exact distance from the table or angle iron in less time than formerly and enables him to find the exact location of the spindle in the center of the hole already



bored, or its diameter, without the use of plugs or buttons.

It is stated that machinery and tool manufacturers find the Hansen Electrocauter one of the most accurate instruments yet devised for determining the accuracy of any machine having a revolving spindle, and that it is also of great assistance in inspection work.

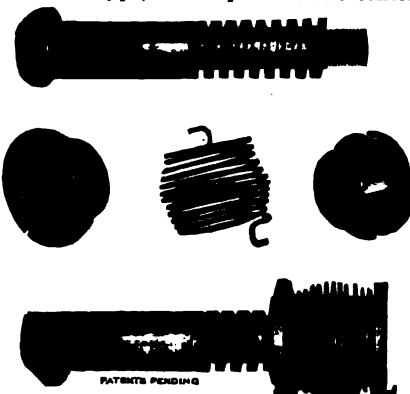
Manufactured by the S. M. Hansen Co., Lynn, Mass. Prices and literature on request.

The Automatic Bearing Bolt is designed to replace the regular connecting rod cap bearing bolts and to take up bearing wear through the action of a coiled spring exerted against a left-hand nut provided with a slot cut in the rim to receive the spring end.

The bolt is provided with an Acme left-hand thread for the revolving nut and a

right-hand "V" thread on a smaller diameter at the end of the bolt for the spring-lock nut. The revolving nut is provided with a chamfered face on the contact side and has sufficient tolerance to offer but slight resistance in taking up wear.

The spring which is attached to the revolving nut as the propelling force, is of the barrel type, which permits the tension



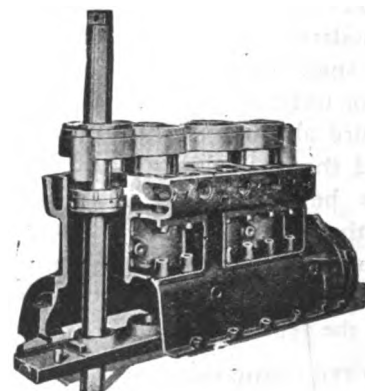
to be acquired from the center coils first and not from the end coils until maximum tension is required, avoiding binding and breakage.

The spring lock nut is provided with four adjustment slots so that any desired spring tension may be obtained and has a right-hand thread which, with the spring tension pulling to the right, locks it on the bolt.

The manufacturer states that the use of the bolt will prevent loose and hammering connecting rod bearings, saving wear and injury to the connecting rod and main bearing, preventing side play and piston slapping and stopping excessive wear on piston pins, bushings and rings.

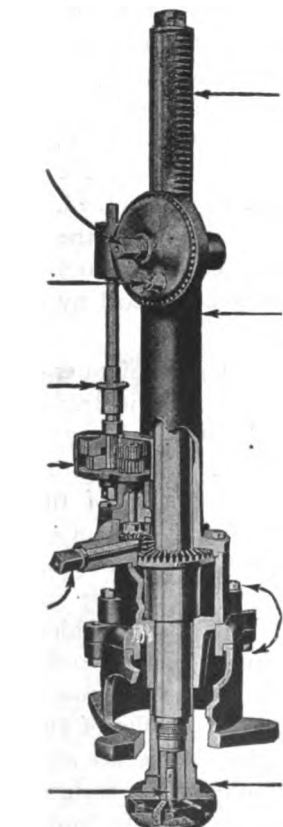
Manufactured by the V & S Automatic Bolt Co., 1120 State-Lake Building, Chicago, Ill. Prices and literature on request.

The Champion Reboring Equipment for Ford cars and Fordson tractors offers a solution for ridding the engine cylinders of scores, deep scratches or elliptical bores which might cause loss of compression and piston slap. It is stated that it is possible to rebores a model T Ford cylinder block with this tool in 30 minutes



and a Fordson block in 45 minutes. Fitting the cylinders with oversize pistons and rings gives additional power and prevents loss of compression.

Manufactured by the Champion Manufacturing Co., 2008 W. Fletcher Street, Philadelphia, Pa. Price and literature on application.

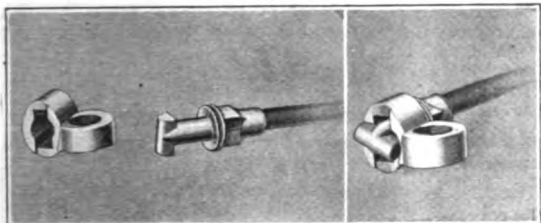


ing bar and the drive of the feed mechanism are simultaneous. The feed mechanism consists of a set of quick

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The **F & M Non-Corrosive Self-Locking Battery Terminal** offers a simple, practical method of locking a non-corroding soft metal battery terminal without the aid of nuts, bolts, screws or wedges. The connectors, it is stated, can be disconnected in a second or two, while a slight turn of the terminal locks the connector in place.

As the terminal ends are of lead, the soft metal of the terminal seats readily



and is not easily jarred loose by vibration, making a joint which does not sulphate and forms a clean connection.

The battery connectors are burned to the battery posts in the usual manner and the only tool necessary for removing the terminals is an ordinary open-end wrench such as is carried in the car tool kit.

Manufactured by **Fraser & Marsh, 347 Naugatuck Avenue, Devon, Conn.** Prices and literature on request.

The **Aermore Exhaust Horn**, designed with a special valve fitting, is now available for tractor use and offers a unique solution of warning the operator when trouble occurs on the machine which requires the shutting down of the tractor, or for other signalling purposes.

The tone of the Aermore horn is pleasing to the ear and its penetrating four-



toned sound may be heard a mile or more, but at the same time is not shrill enough, the manufacturer claims, to scare horses.

Manufactured by **the Fulton Co., Milwaukee, Wis.** Prices and literature on request.

The **Victor Gasket-eer** is a patented silent gasket salesman or cabinet which is placed on the show case or other convenient location and shows at a glance the various sizes and types of Victor gaskets which are made for tractors, trucks and passenger cars.

The case or cabinet is strongly built of one-half inch material, finished in mahogany and is fitted with substantial fiber dividers which keep the sizes separate. On the inside of the cover are displayed samples of gaskets carried in stock, each gas-



ket burnished and lacquered to retain the high finish, and are set in a background of artificial leather. The gaskets are filed

numerically while in front of the first divider is a Victor gasket list in which the number of a gasket called for can be readily found.

The cabinet contains 30 different types and sizes of copper asbestos gaskets used in over 140 different makes of cars, trucks or tractors.

Manufactured by **the Victor Manufacturing & Gasket Co., 5750 Roosevelt Road, Chicago, Ill.** Price on application.

Splitdorf Spark Plugs are made in a variety of types in standard sizes and of special dimensions to suit engines of every make. Ruby India mica is used exclusively as insulation and is unaffected by heat, as well as fibrous, tough and unbreakable.

Splitdorf spark plugs are not only leak-proof when made, but every explosion of the engine cylinder, it is stated, tightens them. The green jacket adds neatness and appearance to the plug, but has nothing



to do with its functioning.

Splitdorf Green Jacket Plugs are easily disassembled for cleaning by using two wrenches to loosen the lock nut, which fits against the copper-asbestos gasket.

Manufactured by **the Splitdorf Electrical Co., 98 Warren Street, Newark, N. J.** Prices and literature on request.

The **Sharon Brute Trailer** is especially designed for heavy duty service with tractors in warehouses, terminals and transfer stations and the trade name "Brute" is descriptive of its unusually strong construction.

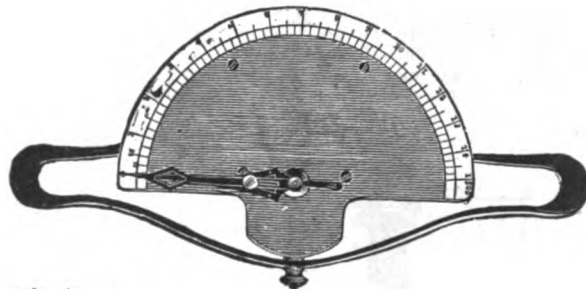
The frame is made up of 4 1/2-inch chan-



nel sections pressed from 1/2-inch hot rolled open-hearth steel, rivetted into one-piece channel section with the corner pieces pressed to a six-inch radius, with a

(When Writing to Advertisers, Please Mention the MOTOR TRUCK.)

The **Chatillon Dynamometer** is designed to indicate in an accurate manner, by means of a spring indicator and dial, the number of pounds pull or torque exerted by an engine drive shaft at certain speeds. The instrument may be used either in connection with the Prony brake method of determining horsepower and torque, or may be used with electric or water dynamometer acting as a spring balance,



which measures the pounds pull exerted through an arm of predetermined length.

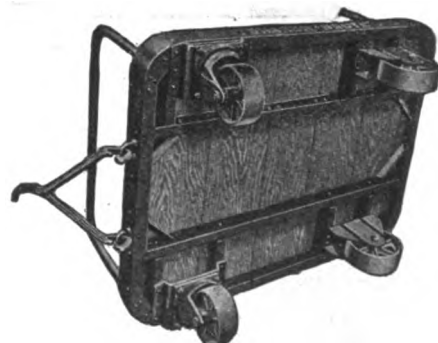
Manufactured by **John Chatillon & Sons, 85-93 Cliff Street, New York City.** Prices and literature on request.

hole for a stake pocket. By varying the length of the side and end rails the "Brute" can be made in any length up to 72 inches and in any width up to 50 inches.

Two additional members, running lengthwise beneath the floor, are of three-inch pressed steel channel, rivetted to the end rails and braced laterally to the frame with front and rear pressed steel "V" braces which take the pull of the 1/2-inch steel forged coupler. Either one or two couplers can be supplied.

The rear wheel and front caster supports are three-inch pressed steel channels rivetted to the side rails and longitudinal members of the frame. The rear wheel brackets are pressed from 1/2-inch steel with two stiffening ribs on each side, a construction at least twice as strong as any malleable casting. The rear wheels are of malleable iron with six double-web spokes and a 3 1/2-inch face, with three-inch Hyatt roller bearings on a one-inch shaft, hardened and ground.

The front casters are of heavy-duty type, ball and roller bearing equipped, bolted to a 1/2-inch steel plate rivetted to the frame. The floor of the trailer is 1 1/2-inch oak recessed flush in the side and end rails. All frame members are flush on the



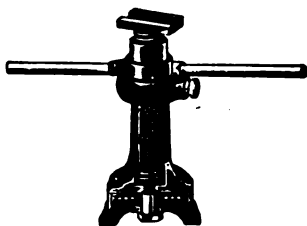
bottom, thus affording an even support when the trailer is used in connection with a lift truck.

The "Brute" trailer was recently given a severe road test with a load of 8000 pounds, which revealed no weaknesses, it is stated, and which indicated its adaptability to the most exacting service.

Manufactured by **the Sharon Pressed Steel Co., Sharon, Pa.** Prices and literature on request.

The Millers Falls 15 Ton Jack No. 155 is designed especially for heavy duty truck and tractor service and features several special ideas. The No. 155 jack is of the horizontal type which is easily placed in close quarters and is operated by a short horizontal handle which extends at either side. Roller bearings are used in the base between hardened steel discs which carry the load of the jack in lifting which makes possible the raising of the tonnage stated.

The ratchet operates to either the right or left by simply turning the knurled ratchet pawl. The concave steel cap is set fast to the upper end of the screw, and both remain stationary while the barrel revolves around the screw.



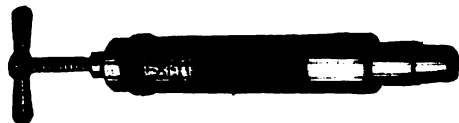
The king bolt passes through the stationary base into the barrel and revolves with it. The screw has a perfectly cut acme thread which meshes correctly with the barrel. When the screw reaches its topmost point the stop pawl automatically prevents its being turned out of the barrel, doing away with any possibility of the load falling.

The concave shape of the cap adapts it to any shape of axle, while the round base gives a sure solid footing regardless of ground conditions.

Manufactured by the Millers Falls Co., Millers Falls, Mass. Price and literature on request.

The "Dot" High Pressure Lubricator for passenger cars and trucks consists of a grease gun, a filler for the gun, nipples to conduct the grease from the gun to the bearings and dust caps for the nipples.

It is essentially a one-hand operated gun, solidly built as one unit and eliminates the annoying flexible tube so commonly used. One of its principal features is a patented automatic valve which opens and closes when the gun is attached to and detached from the nipples. In using the gun its nozzle end is placed over the nipple and the gun is then turned one-quarter turn to the right. During the first half of this turn the gun is securely clamped to the nipple and the connection



is sealed against any amount of grease pressure that may be required for lubricating the bearing. During the second half of the one-quarter turn to the right the valve in the nozzle is opened, permitting the grease in the gun to be forced through the nipple onto the bearing. The valve cannot open, however, until the connection has been thoroughly sealed. Leakage during lubrication is impossible, it is claimed, because as the pressure of grease is increased the connection becomes more firmly sealed. After the bearing has been lubricated the gun is detached by giving it a quarter turn to the left. During the

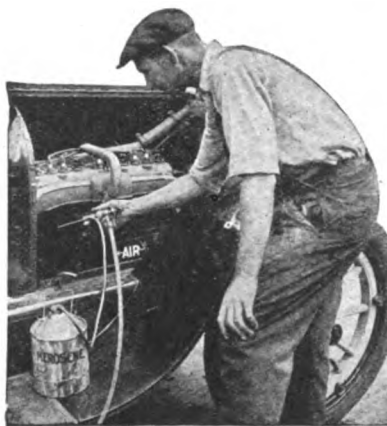


first part of this quarter turn the valve is closed, and then during the second half of the quarter turn the nozzle is unlocked and the gun may then be slipped off of the nipple. The automatic valve contributes many of the working advantages of the "Dot" gun. The nipples are made in all

the forms and with all the different threads necessary to adapt it to any chassis. They screw on in the same place that grease cups are used and are designed to receive the grease from the gun and conduct it to the bearings. These nipples have a very ingenious and very attractive looking dust cap which is an adaptation of the Carr "Durable Dot" fastener. The important advantages of the "Dot" gun itself are well supplemented by the unique patented filler which goes with it as regular equipment. This filler will take the grease from any grease container irrespective of its size and shape and will fill the gun very quickly and cleanly, and without the user's hand touching the grease at all. By means of this filler it takes less than one-half minute to fill the gun solidly full of grease.

Manufactured by the Car Fastener Co., Boston 39, Mass. Price and literature on request.

A Kerosene-Air Engine Cleaner has recently been placed on the market which uses air from the service station tire inflation pressure system and with the aid of a small can of kerosene quickly washes off the accumulation of dust and oil adhering to the engine base and cylinders. A nozzle of suitable size is provided which is connected to the air stream and to the kerosene can by rubber tubes. The air passing out of the nozzle under pressure



draws the kerosene from the container and sprays it with sufficient force to wash off the greasy deposits in very quick time.

After the surface of the engine has been cleaned with the spray, the kerosene may be shut off entirely and the engine dried with the air jet. The cleaner, it is stated, will fit all makes of air chucks so that it may be used universally.

Manufactured by the Imperial Brass Manufacturing Co., Chicago, Ill. Price on request.

The Super-Weld Creeper No. 196 consists of a combination head rest and anchor device for the service station repairer who is obliged to work under a car or truck.

The creeper is constructed of steel with all joints electrically welded and finished in bright red so as to be easily seen by car drivers. A special head rest is provided which when in the raised position locks the creeper, preventing forward or backward movement.

Roller wheels are provided for moving the creeper under the car and there are neither bolts or nuts to loosen. Manufactured by the Welded Products Manufacturing Co., 145-149 Clinton Street, Milwaukee, Wis. Price, East of the Rockies, \$7.50.



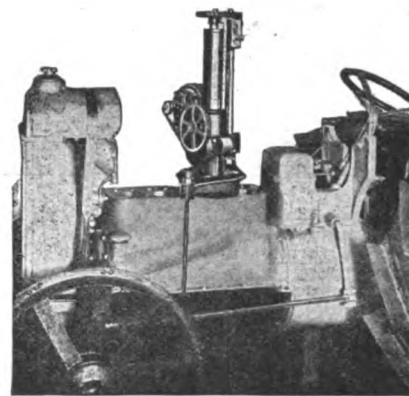
vided which when in the raised position locks the creeper, preventing forward or backward movement.

Roller wheels are provided for moving the creeper under the car and there are neither bolts or nuts to loosen.

Manufactured by the Welded Products Manufacturing Co., 145-149 Clinton Street, Milwaukee, Wis. Price, East of the Rockies, \$7.50.

(When Writing to Advertisers, Please Mention the MOTOR TRUCK.)

The New Storm Motor-Driven Cylinder Boring Machine is shown herewith. It is designed especially to meet the requirements of average sized garages where electric current is available and possesses a number of unique and important features. The machine is built extra heavy and rigid throughout, using the Storm patented power machine cutter heads, these heads being supported by a heavy, rigid, hardened steel bar, which is ground to perfect accuracy and exact size. Extra long, heavy machine bearings give rigid support to the bar. These bearings are adjustable so as to take up any play



and can be easily kept in perfect adjustment. Cutter gears are used throughout and a heavy internal feed screw and feed bar. Its total capacity is 2 1/2 to six inches, sufficient to take care of practically all sizes in common use. The machine weighs approximately 300 pounds.

A heavy base, not shown in the cut, is provided for use in connection with the machine for shop work, making it a permanent and convenient shop fixture, and yet it has the big advantage of being capable of use independent of the base as shown for reboring motors of all types without removing them from the chassis.

The machine is furnished for boring only or for both boring and burnishing. The burnishing head consists of a hardened steel arbor having a special shank to fit the boring bar and is surrounded by special tool steel rollers all ground to exact micrometer size, and are held in a special roller housing. In using the burnishing heads the cylinders are first bored slightly under the desired finished size. After all the cylinders of the block have been bored to this size the cutter head is removed and the burnishing head is substituted. The rollers work in oil and pass through the cylinder compressing the metal by crowding it back, giving it an extra hardness and polished smoothness. The result is a true, accurate, smooth bore, greater efficiency in the operation of the motor and longer life of the cylinder walls.

Manufactured by the Storm Manufacturing Co., 406 Sixth Avenue, South, Minneapolis, Minn. Price and full information on request.

The Millers Falls Three-Ton Truck Jack No. 150 is designed especially for use with trucks up to three tons capacity. It operates easily with one hand and can be operated under over-hanging bodies as it works with a horizontal lever action. By turning the knurled ratchet pawl the ratchet is operated to either the right or left as desired. When the screw reaches the maximum height the stop pawl automatically prevents it being turned out of the barrel, eliminating the possibility of the load falling. A forged screw is used fitted with a perfectly cut acme thread, which meshes correctly with the barrel. The cap is broad and concave in shape, adapting it to any shape of axle. The base is purposely made wider than necessary to prevent sinking in soft spots.

Manufactured by the Millers Falls Co., Millers Falls, Mass. Price and literature on request.

THE MOTOR BUS FIELD

*A DEPARTMENT DEVOTED TO THE
INTERESTS OF MAKER AND USER*

MANUFACTURE — DISTRIBUTION — OPERATION — DEVELOPMENT — NEWS

Californians Cater to Motor Carrier

Union Stage Depot's Motor Busses, in Los Angeles and
Fresno, Having Traffic of 400,000 Passengers
a Month, Displace Trolleys.

SUBWAY, elevated and surface lines have their New York and canals their Panama, but the motor stage has its California. Nowhere is the motor bus as a public carrier more widely and consequently more systematically used than on the climatically fortunate Pacific coast, with its added advantage of good roads in abundance. Union stations, with their endless cross currents of arriving and departing trains and their cos-

mopolitan crowds, are as universal as our metropolitan centers; the more recent Union Stage Depot as a clearing house for motor stage patrons, though not so frequently encountered, retains all the atmosphere of the railroad terminal. Two monuments to the popularity of the motor bus in California are the Union Stage Depots at Fresno and at Los Angeles.

AT FRESNO, where 17 distinct companies, partnerships and individuals are affiliated in the Interurban Auto-Stage Terminal association, 63 busses—31 of them Whites—operate in and out of the stage terminal. The 3000 passengers who pass through the Fresno stage depot daily represent a 10 per cent. increase in patronage during the two years the station has been in existence.

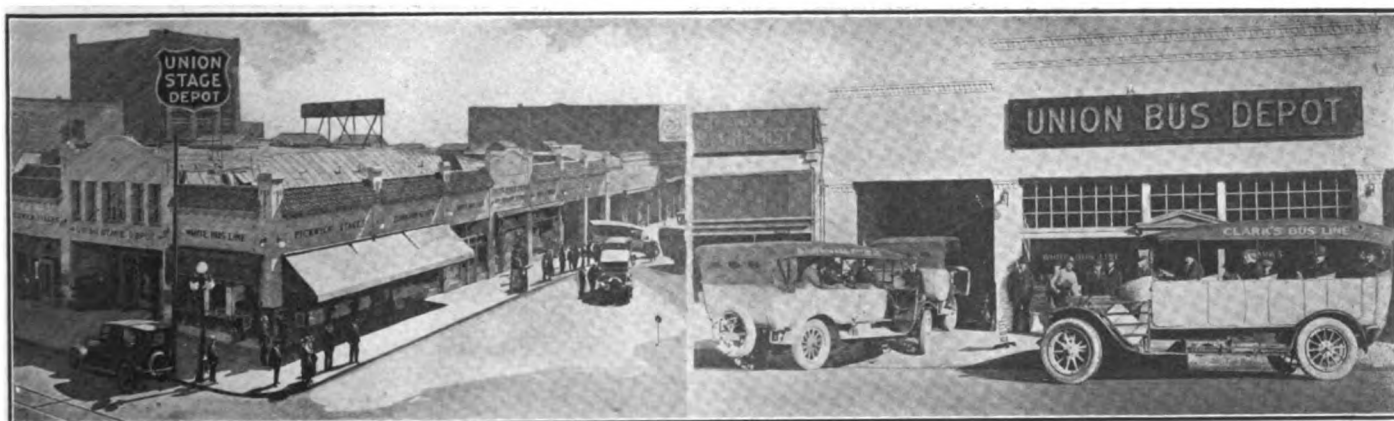
More than half the population of Los Angeles—or 312,000 of the 575,480 residents—use the Union Stage

Depot in that city regularly. Daily, 250 busses pass in and out of the depot. Two years ago, when the station was first opened, the average monthly carry of the Motor Transit Co. was 20,000 passengers every 30 days.

As might be expected, where distances are great and roads good, these Whites of the Motor Transit Co. are making high mileage records. Among the many machines operated by the Mountain Auto Line division is a White that has travelled more than 200,000 miles.

Said to be the largest enterprise of its kind in the world, the Union Stage Depot, Inc., of Los Angeles, may well be considered to represent the plan of operation and the advantage of the typical union stage depot.

Radiating like strands in a spider web from the doors of the depot in Los Angeles, the routes which the busses of the associated stage lines cover connect over 2100 miles of California highway. Schedules are carefully planned and so rigidly adhered to that railroads print in their



More Than 2100 Miles of California Highways Are Covered by the Bus Routes of the Associated Stage Lines from the Union Stage Depot, Inc., of Los Angeles—This Is the Largest Enterprise of Its Kind in the United States at the Present Time, but Other Localities Are Recognizing the Efficiency of the Bus and Eventually Will Fall Into Line.

time tables the schedules of bus lines making connections with trains.

Each bus, as it arrives at the terminal, stops first at its particular platform to discharge passengers, then proceeds to the loading platform, which can accommodate 14 cars at a time. Before going out on the road again each car is subjected to a thorough inspection. If minor adjustments are found necessary, they are made in the service station maintained a few feet from the loading platform. Should the inspectors "condemn" a car for repairs that will require some time to complete, a "guard" car is ordered into the breach to substitute for the incapacitated car until such time as it is ready to resume its run. Thus time losses are reduced and service to the public improved.

Other advantages are reflected in



There is Always a Crowd Waiting for the Busses—This Illustration Shows Only a Portion of the Big Waiting Room of the Union Stage Depot.

the comparatively low rates now charged for motor stage travel, rates made possible by the 50 per cent. reduction in administrative overhead

through the "pooling" of interests, by the elimination of duplications, and by the centralization of maintenance facilities.

Judge Calls Bus Ordinance, "Cold and Deadly"

DECLARING that the Kansas City law regulating bus transportation and operation was "cold and deadly to the interests of the vehicle owners," Judge Henry Lamm of Sedalia, Mo., attorney for the cabmen, pointed out recently in the hearing of the injunction suit

that the attorneys for the street railways company would have it believed that the owners were law violators.

Judge Lamm, a former judge of the Supreme court of Missouri, is one of the attorneys representing the bus men in the fight for an in-

junction to stop the enforcement of an ordinance that requires obtaining the consent of more than 50 per cent. of the property owners on a street before they can operate over that thoroughfare.

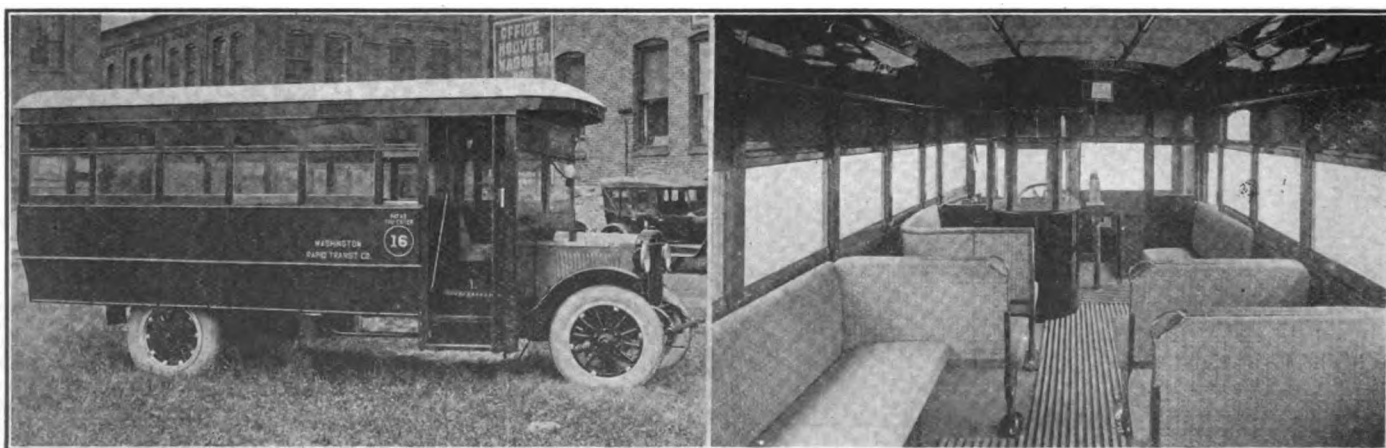
The suit is being heard before Circuit Judge Nelson E. Johnson.

Hoover Body Used by Washington Rapid Transit Co.

THIS picture shows the Hoover bus body. It was designed by the Hoover Body Co., York, Pa., for the Washington Rapid Transit Co. of Washington, D. C., which is operating a fleet in that city. The body, mounted on a Duplex Limited special bus chassis, has a low center

of gravity, removable sections at the rear wheels, a rivetted roof and especially treated auto steel panels. The interior is finished in mahogany. All seats are upholstered with rattan and specially arranged to give maximum standing room. The equipment consists of conveniently

placed lights, push buttons on each post, fare box, destination sign, rear-view mirror and light at step. It also includes a heating equipment connected to the engine exhaust. The seating capacity is 25 passengers, although more can be carried in an emergency.



A High Degree of Development Is Shown in This Large Bus Operated by the Washington Rapid Transit Co.—The Hoover Body Co., York, Pa., Is the Builder—A Duplex Limited Special Bus Chassis Is Used Which Has a Very Low Gravity Center.

Char-a-Banc—The Poor Man's Car

Goodyear Official, Recently Returned from Abroad, Gives Impressions of Popular Vehicle Much Used in England Which Has Developed Since War.

THE increasing popularity of the large-sized passenger-carrying automobiles was one of the striking features of the London automobile show just held, according to the report of George M. Sprowls, field representative of the Goodyear Tire & Rubber Co. The char-a-banc or cross-country bus, which is used generally for special excursions to the seashore and countryside, has developed very rapidly in popularity since the war. England has had a very good driving season this year with an unusually early spring and late fall, combined with very hot weather in the summer, which drove people to seek the out-of-doors as often as possible.

THE char-a-banc offered a chance for those who did not own cars to enjoy the comforts of motor-ing. For many people the char-a-banc took the place of the low-priced automobile of this country.

There is quite a controversy on as to what the final size of the char-a-banc should be. The majority of them now are quite large, seating from 30 to 35 passengers.

The larger size seems to be more economical, but advocates of the smaller car argue that the English travelling public is used to more or less privacy in travelling and would prefer the somewhat smaller vehicles.

The most common type of char-a-banc body is one with long cross-wise seats each holding five persons. Entries are by side doors opposite each seat. The cars have a top on them, but it is seldom used.

due to the fact that the Englishman prefers the open air. There is a development, however, toward what they call an all-weather body.

Another body which stood out rather prominently had permanent tops in the front and rear for those who desired protection from the weather, while the center portion

of the vehicle was left open.

Another type of passenger-carrying vehicle which is growing in popularity is the motor coach, which is used for regular trips between towns and for extended tours, such as up into Scotland or over into France.

These have closed bodies and are quite well appointed. One of the finest cars at the show was a motor coach built to carry 26 persons; the interior was finished in veneered walnut and divided into two compartments. Seats were not arranged in a fixed order, but consisted of leather upholstered chairs arranged as they might be in a drawing room; each compartment also had a folding table.

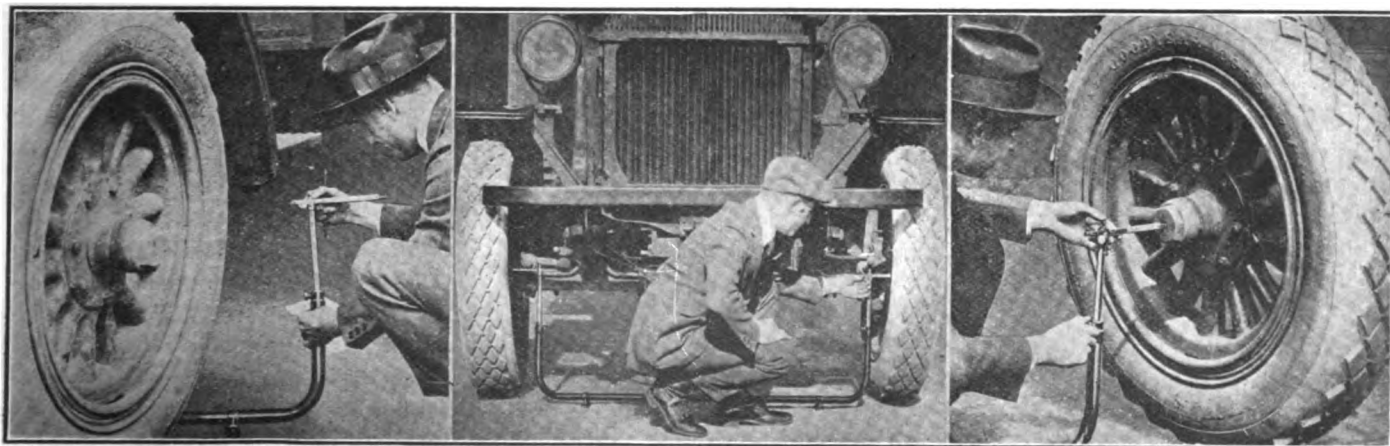
Another type had permanent seating arrangements along more conventional lines with aisles down the center. These seats have high backs and very easy springs, making them unusually comfortable. Large windows provided excellent air and these bodies mounted on pneumatic tires will ride about as easily as a private touring car. This type of car seated about 20 persons.

A more inexpensive type of car was shown with strong, substantial body, seating 26 passengers.

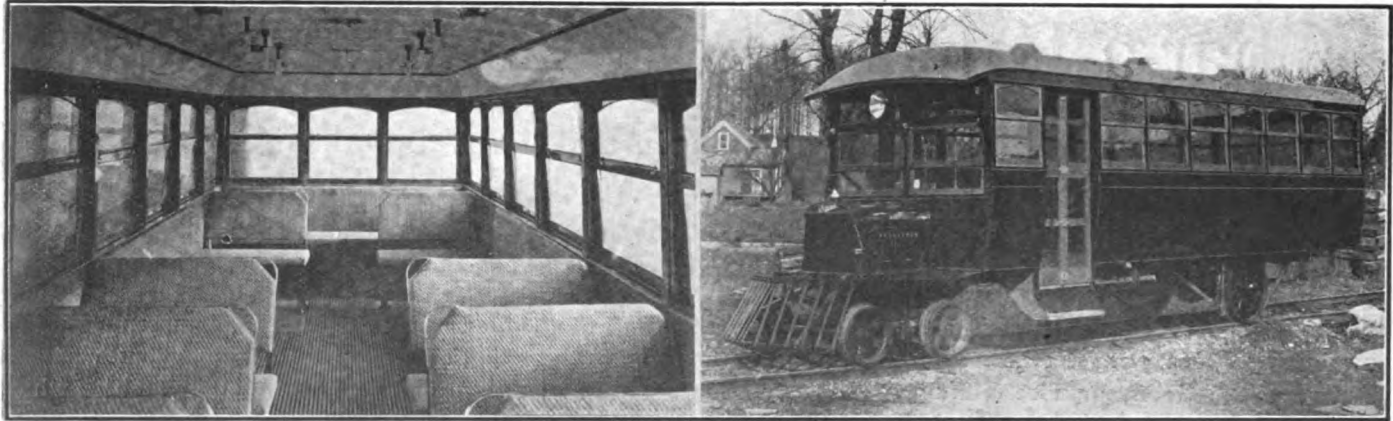
RAILROAD FIGHTS TRUCK'S INROADS

TO COMPETE with the many motor bus lines radiating from Lansing, Mich., the Michigan Central railroad has started a schedule of fast local passenger trains over its lines. It is predicted that if the experiment is a success in coping with truck competition, the service will be extended.

Approved Method Of Aligning Bus Wheels



Left—Taking Reading of Aligning Pointer Indicating Distance Between Felloe Bands at Rear of Front Wheels. Center—Measuring Distance Between Felloe Bands of Front Wheels. Right—Trueness of Wheels Shown by Pointer at the Hup Cap.



Backing at Full Speed Is One of the Special Features of This Service Motor Coach, Which Has Four Speeds Ahead and Four Reverse—The Front Axle Is Replaced by a Four-Wheel Pony Truck Having the Chilled Iron Wheels and Car-Type Axles.

Motor Coach Economical

Short-Line Railroad Doubles Running Time, Carrying
Passengers at Low Rate by Use of Service Bus Which
Makes 84 Mile Trip for \$10

THE first railway motor coach built by the Service Motor Truck Co. was put in operation in 1914. It was used by a little railroad down in Tennessee, and is still in operation. It was built on a $1\frac{1}{2}$ -ton truck, and in view of the modern railway motor coach is rather an impossible looking outfit.

During the seven years following this first installation, there has been a constant increase in the interest paid to the railway motor coach, and about a year ago

the railroad division of this company was organized and began devoting especial attention to this field.

The photograph shows the smaller type of coach which is being produced at this time, having a seating capacity of 30 passengers, and a normal speed ranging from 25 to 30 miles an hour, depending upon the gear ratios and local operating conditions. The gear ratios are varied, of course, depending upon the grades and curves of the road over which the car is to operate.

THE chassis is a motor truck chassis, especially adapted for rail operation. The front axle is replaced by a four-wheel pony truck, having chilled iron wheels, solid car type axles, plain brass bearings and swing motion bolster. The rear axle is of the worm-drive type, fully enclosed and running in oil. The wheels are 32 inches outside diameter, fitted with M. C. B. standard rolled steel tires.

A special transmission is provided so that this car has four speeds forward and four speeds reverse. While the car is normally intended for operating in the forward direction, it can, if necessary, be backed at full speed—as in backing into a terminal.

The engine is a $4\frac{1}{4}$ by $5\frac{1}{2}$, four-cylinder, motor truck type, actually developing 40 horsepower at its rated speed of 1400 revolutions per minute.

The clutch is of the single-plate

AN IMPORTANT ANNOUNCEMENT.

MOTOR TRUCK for February will be issued as a Special Bus Number. It will be replete with facts regarding this very important development of the motor truck, will feature authoritative articles on bus operation and will detail the experiences of successful bus line operators. Manufacturers prominently identified with the evolution of the motor passenger carrier will give their views on the future of the industry and the entire issue, devoid of conjecture and dealing with specific, concrete facts, will be of real value to all.

type, driving to a special reversing transmission through fabric universal joints. From the reversing

transmission the drive is taken by additional fabric joints to a four-speed amidships transmission, and then by metal joints, fully inclosed, to the rear axle.

One feature of this car is that all major bearings, such as wheel bearings, worm bearings, transmission bearings, as well as engine main bearings and connecting rod bearings, are adjustable for wear.

On an experience of over 25,000 miles in actual service this car has shown the following results:

Normal speed, 30 miles an hour; hill-climbing ability, two per cent. grades on high gear, four per cent. pulling a trailer weighing a total of about six tons, loaded, on third gear at 15 miles an hour; gasoline consumption, 10 miles a gallon; oil consumption, 400 miles a gallon.

The total cost per day in this particular case, on a round trip of 84 miles, is under \$10. This includes

(Continued on Page 52.)

The Spirit of Transportation

THE prediction that the next few years will see the establishment of motor bus lines in nearly all of our American cities, either by or in competition with the traction lines, was made by Ezra W. Clark of the Clark Equipment Co., Buchanan, Mich., at the Annual Credit convention of the Motor and Accessory Manufacturers' association at the Hotel Statler, Detroit, recently.

The truck manufacturers of America will find, according to Mr. Clark, the building of specially de-

signed motor busses a potentially profitable field for the next few years. He called attention to the fact that the special requirements of the motor bus field were such that truck manufacturers must design special chassis for this type of vehicle, as it has been demonstrated many times that the standard motor truck chassis is not suitable for conversion into a motor bus. "It was only a few years ago that a very large percentage of the motor trucks in use were, in reality, but converted passenger car chassis," said Mr. Clark.

"THE use of these converted motor trucks soon developed two facts: First, that the world needed motor trucks; second,

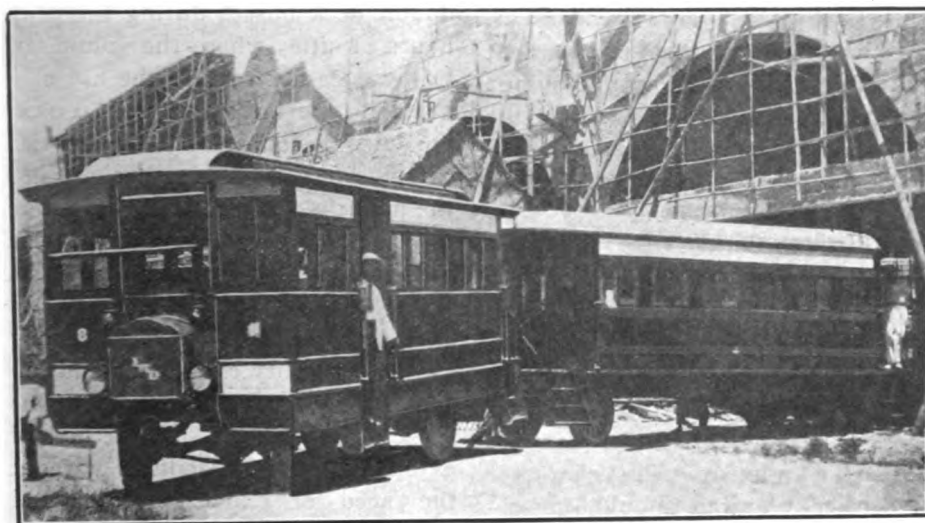
tion is increasing at the rate of 34.9 per cent. as compared with 11.1 per cent. in rural districts.

"The burden of transporting the

fallen, in the main, upon the trolley systems of America. New York, Chicago, Boston and Philadelphia have supplemented the trolley with elevated lines and subways. (Chicago's subway designed but not constructed.) Trolley building has almost ceased in America.

"The cessation of trolley construction has been due to the increasing costs of construction and the growth of the automobile as a passenger carrying vehicle. This new unit of transportation has supplemented existing transportation systems and by reason of its speed and flexibility, has greatly enlarged the residential sections of all our cities. Our streets have now become too crowded for the convenient use of personal cars.

"The parking requirements are so onerous as to seriously restrict the bringing of private cars into the business districts of our cities.



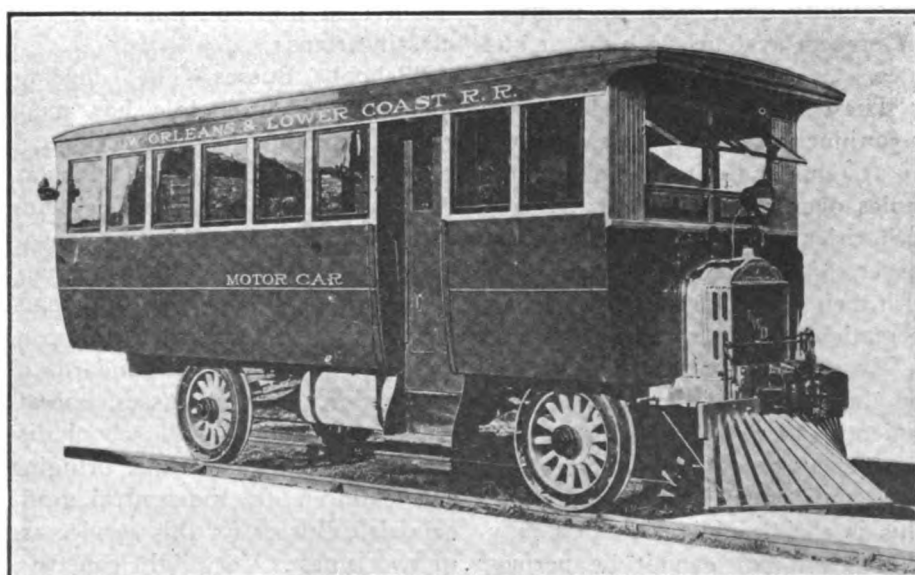
Street Railways in China Are Motorized to Quite an Extent—This Shows One of Several F. W. D. Trucks Fitted Up to Take the Place of Street Cars.

that a passenger chassis could not be made to do double duty in the specialized field of freight transportation.

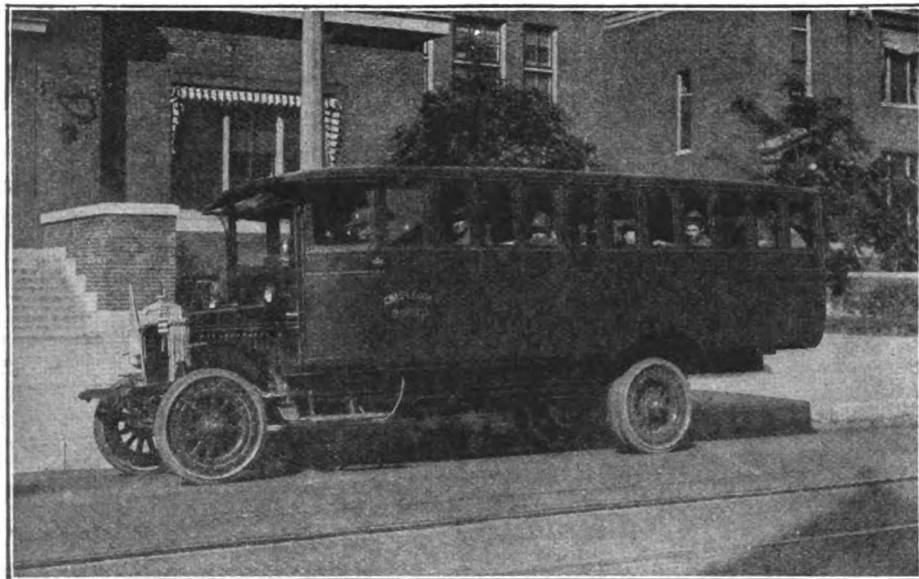
"Opportunity and ability constitute duty. America needs motor busses. The motor truck industry of America has the ability to produce motor busses and the fulfillment of this obligation will bring the automobile industry under the approving eyes of the nation. Doing a worth while thing well will establish our industry in the good will of public opinion.

"The population of the United States increases approximately 20 per cent. every 10 years. It has increased from 75,000,000 in 1900 to 105,000,000 in 1920, of which a disproportionate percentage has occurred in the cities. Urban popula-

immense armies of city workers to and from their homes each day has



This F. W. D. Used by the New Orleans and the Lower Coast Railroad Is Equipped with Steel Flanged Wheels, and Also Sports "Cowcatcher."



An Atterbury Chassis Has Been Used to Mount This Large Capacity Body—The Seating Arrangement Is Ideal It Would Seem and There Is an Abundance of Light.

"Sporadic outbreaks of 'jitneys' in various cities, show the possibilities of motorized passenger transportation—these epidemics have also shown the fallacy of trying to operate high-powered, small capacity passenger automobiles at a profit. The public has been educated at the expense of the 'jitney' owners and operators.

"The growth and development of most cities has radiated from their business sections along fixed lines of transportation so that in many cities outlying and neighborhood business and recreation centers have grown up with startling rapidity.

"An analysis of the transportation facilities of any of our cities in view of these facts, will show a wonderful opportunity now open to improve the present systems with motor bus lines.

"These may be operated by and in conjunction with the present trolley systems or by independent companies over routes laid out by city authorities so as to bring the wage earners of the cities into close touch with their places of employment and recreation.

"Every city owes to its citizens the duty of providing quick, convenient and comfortable means of transportation to and from their regular employment and recreation. This is a civic obligation that may be delayed, but cannot be permanently avoided by municipal graft or corruption.

"The quickest, most convenient and most comfortable way in which the present transportation systems of our cities can be supplemented and enlarged is by the development and use of the motor bus.

"An exhibition of the successful operation of motor bus lines in some of our larger cities indicates that this phase of city life will see a marvelous and stupendous growth in the next few years.

"Specialized work requires specialized equipment. The character of service required should govern the design and construction of motor vehicles used for the commercial transportation of passengers. Eliminating the automobile and taxicab motorized passenger vehicles may be divided into the following four classifications:

"School Busses—The development of the automobile has made rather startling changes in the systems of rural education. The isolated 'little red school house,' is being abandoned in favor of larger consolidated schools in the centers of rural population. This evolution means larger and better schools with a consequent raising of the standards of instruction. School busses, operated by townships and school districts, make regular runs, bringing the children to the central grade schools. Busses for this service are of two types: Very light construction for use on dirt and unimproved roads and the heavier type designed

for use on improved and hard roads.

"Motor Stages—Seating from 12 to 20 passengers, operated by one man; pneumatic tires; speed of 20 to 35 miles an hour. This type of vehicle is suitable for suburban service and passenger traffic between cities. Motor stages of this type—the European charabanc—are now very largely used in California and many of the western railroads are using them as feeders to and from their divisional points.

"Single-Deck Busses — Seating from 18 to 30 passengers, operated by one man; pneumatic tires or cushion wheels; speed governed by ordinance. This type of bus can be used to supplement the service of double-deck busses during the peak hours in cities where the volume of traffic does not require the use of a heavier type bus; also used as extensions to double-deck bus service carrying passengers further out into the suburbs; can be used by public utility companies to supplement present trolley systems and as cross-town feeders. At present it is almost impossible to raise money for public utility extensions and improvements, and this type of bus presents an inexpensive method of extending present facilities without the need of expensive track and power house construction. This type of bus can also be used for transfer of passengers between railroad terminals and hotels.

"Double Deck Busses—Seating from 40 to 50 passengers, manned by driver and conductor; operating on solid tires or cushion wheels. This type of motor bus is indicated for service along regular routes preferably on streets not occupied by trolley tracks, covering distances from four to 10 miles along the main arteries of traffic. They can be profitably operated in large cities and in smaller cities where there is a heavy peak load at certain hours of the day.

"There are, in addition to the types mentioned, one or two other phases of motor bus construction which may be described as incidental to a period of transition. In this class should be placed the trolley bus, operating without tracks on

rubber tires, obtaining its power from an over-head trolley. Also the flanged-wheel motor bus, operating economically and efficiently as a passenger vehicle on short-line railroads where the traffic does not warrant the use of expensive railroad equipment.

"Motor bus operation in many cities has shown that standard truck chassis are not suitable for motor bus construction and service for the following reasons: Excessive weight; too much unsprung weight; high center of gravity; rigidity of suspension; unsuitable gear ratios; narrow treads; large turning radius; stiff steering gear; high top clearance; high passenger floor; too short wheelbase, causing dangerous overhang.

"The development of these shortcomings of standard truck construction shows the necessity of special construction for motor busses, covering the following points:

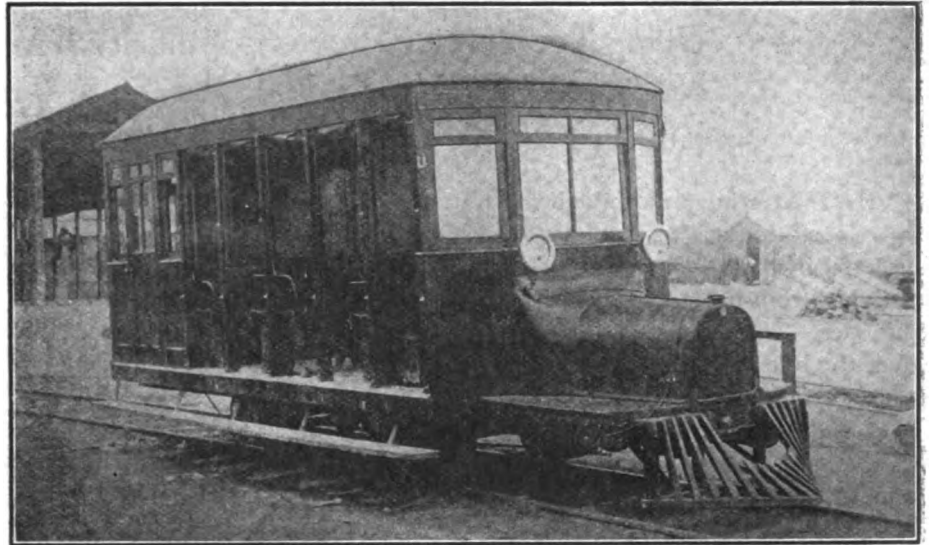
"Lightness with strength (insuring minimum gas consumption); small unsprung weight; low center of gravity; flexible control; special transmission; side treads (eliminate swaying of bus); ample wheelbase (to prevent undue overhang); short turning radius; low step entrance and exit; low top clearance; curb receipt and delivery of passengers; ample brake capacity (to provide for frequent stops); high-low gear efficiency (to provide for frequent starts).

"The above points cover the desirable and undesirable features to be considered in the construction of double and single-deck busses for regular city routes. As important considerations are involved in the special designing of motor stages and school busses, but time does not permit an enumeration of these factors.

"Bus Trailers — Consideration should also be given to the use of bus trailers in the peak hours of traffic. They should have their own brake equipment.

"Out of the motor truck industry will arise in the next few years the spirit of transportation which will give to America automotive transportation of passengers in specially

Unique Street Cars in Mexico



Operation of This Bus Has Been so Successful That the Monte Alto, Mexico, Officials are Planning to Add Several More Cars of a Similar Construction.

ALMOST coincident with the successful experiment in Port au Prince, Haiti, comes a report from Mexico City of a system of street cars built on Dodge Brothers chassis. According to William Benbow, Dodge Brothers Mexico City dealer, the motor railway was worked out only after a long series of experiments by the Monte Alto Railroad Co.

The street car chassis weighs approximately 6600 pounds, with a wheelbase of seven feet. The transmission is adjusted with the original rear axle of the chassis and sprockets for the chains are placed in the naves of the wheels. The diameter

of the wheels is 22 inches. With this car the railway company claims to be able to carry 40 passengers, and with the addition of a trailer 80 can be transported. The 18-mile trip from Mexico City into the interior takes about an hour.

The operation of the motor railroad has been so successful that the Monte Alto officials are planning to add eight or 10 more cars of similar construction. Railroad officials in Desague, San Rafael and Atlixco are also studying closely the possibilities for similar cars in their territories, and are ushering in a new phase of transportation in that country.

designed motor busses.

"The nation now needs and can use a sufficient number of motor busses of the various types enumerated to keep our combined motor truck factories in continuous production for years to come, an activity which will bring business to practically every member of the Motor & Accessory Manufacturers' association, for these motor busses will need frames, engines, transmissions, springs, tires, bushings, bearings, lamps, seats, fenders and all the other necessary components that enter into the construction of commercial vehicles, not overlooking, in this last analysis, rear axles. Many of these component parts and acces-

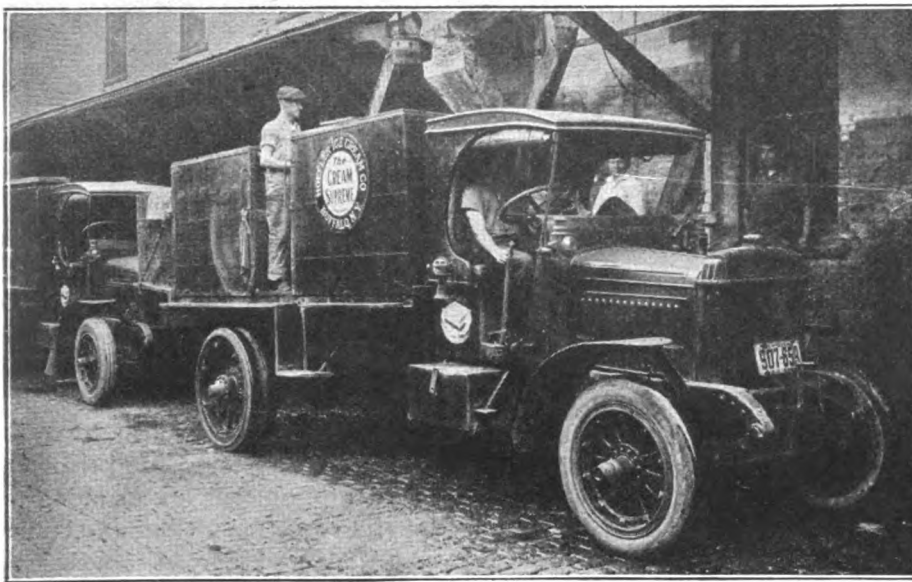
sories can be used as standard units. Other parts need special designing in order to produce a special vehicle for a special purpose.

"Out of the wisdom of our own actions we bring this message: We can only prosper as our industry prospers. The announcement that our concern is interested in the building of special motor bus axles will not raise up for us competition. For years we have been building the only specially designed motor bus axles that have been built in America. The present emergency has only intensified our activities in this most potential field. We know that because the field is potential we will have competition."

Atterburys Used in General Haulage

Diversified Service Proves Popularity of Well-Known Line of Commercial Vehicles—Users State That Trucks Are Efficient—Call Daily Operating Expense Reasonable.

THAT Atterbury motor trucks in many diversified lines of truck transportation are making good is clearly indicated in the many interesting letters which the Atterbury Motor Car Co., Buffalo, N. Y., is constantly receiving from users in all parts of the United States, as well as in foreign countries. The letters do not refer to any special size of truck, but seem to cover the line as a whole from the smaller 1½-tonner to the largest five-ton model manufactured by the company.



L. J. Loesere, Vice President of the Hoefler Ice Cream Co., Buffalo, N. Y., States That Nearly All of the Company's Output Is Delivered by the 23 Atterburys.

THE Atterbury product is made up of well-known units which have proved themselves absolutely dependable in service, such as Continental Red Seal engine, Zenith carburetor, Monarch governor, Brown-Lipe clutch and gear box, Berling high-tension magneto with impulse starter, Spicer universal joints, Timken axles and Timken roller bearings, Gemmer steering gear, Archibald wheels, equipped with Firestone tires and other units of similar popular makes, all of which have been on the market for a number of years and have proved their worth. That trucks of Atterbury manufacture are noted for their rugged construction and ability to perform in a creditable manner in practically any line of transportation service is amply attested in following excerpts from three owners of these trucks.

H. H. Murray, secretary of the Chas. Millar & Son Co., conducting

a plumbing and steam fitting supplies business, at 26 Willow street, Springfield, Mass., states that during the 18 months which they have used their two-ton Atterbury they have spent \$50 for repairs, being less than half a cent per mile travelled and that they consider this very satisfactory when the diversified amount of work is taken into account.

This company furnishes Springfield mills, plumbers and steam fitters with supplies and fixtures, some of the orders being dependent on prompt delivery, so that the Atterbury two-tonner helps to get hold of good business that could not be handled by ordinary methods. The chief work of this truck is to deliver supplies in Springfield and to haul freight to and from the depots. On this work the truck averages five trips daily, making about 25 miles, also handling heavy deliveries within a radius of 10 miles of Springfield.

In the year ending Oct. 1, 1920, this Atterbury travelled 7600 miles in 300 working days. The cost of

(Continued on Page 55.)



H. H. Murray, Secretary of Chas. Millar & Son Co., Springfield, Mass., Is Another Official Who Testifies to the Efficiency of This Popular Make of Motor Truck.

Calendar of Conventions and Exhibitions

Jan. 4-6—Omaha, Neb., Convention and Exhibition, Mid-West Implement Dealers' Association; Secretary, James Wallace, Council Bluffs, Ia.

Jan. 7-13—New York City, National Automobile Show, National Automobile Chamber of Commerce, Madison Square Garden.

Jan. 9-14—New York City, First National Automobile Body Builders' Show, Automobile Body Builders' Association, 12th Regiment Armory; Passenger and Commercial Bodies, Materials and Parts.

Jan. 9-20—New York City, First Annual Retail Dealers' Auto Equipment Show, Hotel Imperial, National Retail Merchants' & Buyers' Association; Accessories and Automobile Clothing; George T. Keen, Secretary, Hotel Imperial.

Jan. 10-12—Minneapolis, Minn., Convention, Minnesota Implement Dealers' Association; Secretary, C. I. Buxton, Owatonna, Minn.

Jan. 11-14—New York City, Annual Meeting, Society of Automotive Engineers.

Jan. 13—Newton, Mass., New England Sectional Meeting, Society of Automotive Engineers, Plant of Stanley Automobile Co.

Jan. 14-20—Cleveland, O., Automobile Show, Cleveland Automobile Manufacturers' & Dealers' Association.

Jan. 14-20—Buffalo, N. Y., Automobile Show, Buffalo Automobile Dealers' Association.

Jan. 14-21—Philadelphia, Pa., Automobile Show, Philadelphia Automobile Trade Association, Commercial Museum; Executive Secretary, Charles C. Bulkeley.

Jan. 16-21—Rochester, N. Y., 14th Annual Automobile Show, Rochester Automobile Dealers' Association, Exposition Park Building; Manager, E. M. Ailing.

Jan. 16-21—Tulsa, Okla., Automobile Show.

Jan. 16-22—Oakland, Cal., Motor Car Show, Alameda County Automobile Trade Association, Auditorium; Manager, Robert W. Martland.

Jan. 17—Buffalo, N. Y., Sectional Meeting, Society of Automotive Engineers.

Jan. 17—Dayton, O., Sectional Meeting, Society of Automotive Engineers; "Lubrication."

Jan. 17-19—Kansas City, Mo., Convention, Western Retail Implement, Vehicle & Hardware Association; Headquarters, Coates House; Sessions in Century Theater; H. J. Hodge, Secretary, Abilene, Kan.

Jan. 17-20—Spokane, Wash., Convention, Pacific Northwest Hardware & Implement Association, Davenport Hotel; E. E. Lucas, Secretary, Hutton Building, Spokane.

Jan. 17-20—Chicago, Ill., Convention, American Road Builders' Association.

Jan. 19-25—Milwaukee, Wis., Annual Automobile Show, Milwaukee Automotive Dealers' Association, Auditorium; Passenger Cars, Trucks and Accessories; Bart J. Ruddle, Manager, 316 Brumler Building.

Jan. 21-27—San Francisco, Cal., Third Annual Pacific Coast Automotive Equipment Exposition, Civic Auditorium, Pacific Expositions Co.

Jan. 21-28—Baltimore, Md., Annual Automobile Show, Fifth Regiment Armory, Baltimore Automobile Trade Association, Inc.; Manager, John E. Raine.

Jan. 21-28—Cleveland, O., Show, Cleveland Automobile Manufacturers & Dealers' Association, Wigmor Coliseum; Manager, Fred H. Caley.

Jan. 23—Milwaukee, Wis., Annual Meeting, Wisconsin Automotive Dealers' Association.

Jan. 23—Montgomery, Ala., Annual Meeting, Alabama Automobile Dealers' Association; James B. Farley, Secretary, Montgomery.

Jan. 23-28—Toledo, O., Automobile Show, Terminal Auditorium, Toledo Automobile Shows Co.; Manager, H. V. Bue-low.

Jan. 23-28—Portland, Ore., Annual Automobile Show.

Jan. 24—Detroit, Mich., Sectional Meeting, Society of Automotive Engineers.

Jan. 24-26—St. Louis, Mo., Convention, Mississippi Valley Implement & Hardware Association; Secretary, F. E. Goodwin, Kirkwood, Mo.

Jan. 24-26—Dallas, Tex., Convention, Texas Hardware & Implement Association; Secretary, A. M. Cox, Dallas.

Jan. 24-26—Denver, Col., Convention, Mountain States Hardware & Implement Association; Secretary, W. W. McAllister.

Jan. 24-27—Louisville, Ky., Convention and Exhibition, Kentucky Hardware & Implement Dealers' Association; Secretary, J. M. Stone, Sturgis, Ky.

Jan. 24-27—Portland, Ore., Convention, Oregon Retail Hardware & Implement Dealers' Association, Imperial Hotel; E. E. Lucas, Secretary, Hutton Building, Spokane, Wash.

Jan. 25-27—Fargo, N. D., Convention and Exhibition, North Dakota Implement Dealers' Association; Secretary, R. A. Lathrop, Hope, N. D.

Jan. 26—Philadelphia, Pa., Sectional Meeting, Society of Automotive Engineers.

Jan. 28—Worcester, Mass., Passenger Car Show, Worcester Automotive Association, Casino.

Jan. 28-Feb. 3—Chicago, Ill., Automobile Salon.

Jan. 28-Feb. 3—Chicago, Ill., National Automobile Show, National Automobile Chamber of Commerce, Coliseum.

Jan. 28-Feb. 4—Allentown, Pa., Automobile Show, Association Building, Lehigh Automobile Trade Association.

Jan. 30-31—Chicago, Ill., Fifth Annual Convention, National Automobile Dealers' Association, La Salle Hotel.

Jan. 30-Feb. 2—Boston, Mass., Sixth Annual Conference, International Delivery Association, Copley Plaza Hotel.

Jan. 30-Feb. 4—Scranton, Pa., Annual Automobile Show, Scranton Motor Trades Association, Armory; Manager, Hugh B. Andrews.

Jan. 30-Feb. 4—London, Ontario, National Motor Show of Western Ontario, Ontario Automotive Retailers' Association.

Jan. 30-Feb. 4—Scranton, Pa., 12th Annual Passenger Car Show, Scranton Motor Trades Association, Armory; Passenger Cars, Trucks, Tractors and Accessories. Hugh B. Andrews, Manager, 411 Board of Trade Building.

Jan. 31-Feb. 2—Chicago, Ill., Annual Meeting, Automotive Electric Service Association, La Salle Hotel.

Jan. 31-Feb. 2—Lincoln, Neb., Convention, Nebraska Retail Hardware Association; George H. Dietz, Secretary, 414-417 Little Building, Lincoln.

Feb. 1—Chicago, Ill., Meeting, Society of Automotive Engineers.

Feb. 1-4—Pontiac, Mich., Automobile Show, Pontiac, Automobile Dealers' Association.

Feb. 3—Chicago, Ill., Mid-West Meeting, Society of Automotive Engineers; "The Constitution of Matter," Professor H. B. Lemon.

Feb. 3-16—Minneapolis, Minn., 15th Annual Automobile Show, Minneapolis Auto Trade Association; Passenger Cars, Trucks and Accessories; W. R. Willmot, Manager, 709 Andrus Building, Minneapolis.

Feb. 4-11—Troy, N. Y., Eighth Annual Automobile Show, Troy Used Car Sales Corporation, Armory; Manager, Frank M. Baucus.

Feb. 4-11—Youngstown, O., Automobile Show, Youngstown Automobile Dealers' Association; Secretary, D. C. Barnett.

Feb. 4-11—Minneapolis, Minn., Automobile Show, Minneapolis Automobile Trade Association; Manager, Walter R. Willmot.

Feb. 6-9—Scranton, Pa., Annual Truck Show, Scranton Motor Trades Association, Armory; Hugh B. Andrews, Manager, 411 Board of Trade Building.

Feb. 6-11—Schenectady, N. Y., Automobile Show, Schenectady Automotive Dealers' Association, Inc., Armory; Manager, John Henley.

Feb. 6-11—London, Ont., Can., National Motor Show of Western Ontario, Auto-

mobile Dealers' Association; Manager, T. C. Kirby.

Feb. 6-11—Winnipeg, Manitoba, Canada, Second Annual Automotive Equipment Association, Board of Trade Auditorium. Secretary, W. L. Williams, New Stovel Building, Winnipeg.

Feb. 6-11—Minneapolis, Minn., Seventh Annual National Tractor Show and Educational Exposition, National Implement & Vehicle Association, Minneapolis State Fair Grounds.

Feb. 7-10—Oklahoma City, Okla., Convention and Exhibition, Oklahoma Implement & Hardware Association; Secretary, W. B. Porch, Oklahoma City.

Feb. 7-10—Grand Rapids, Mich., Convention and Exhibition, Michigan Retail Hardware Association; Karl S. Judson, Exhibits Manager, 248 Morris Avenue, Grand Rapids; A. J. Scott, Secretary, Marine City, Mich.

Feb. 8—Minneapolis, Minn., Tractor Meeting, Society of Automotive Engineers.

Feb. 8-10—Minot, N. D., Convention, North Dakota Retail Hardware Association; Secretary, C. N. Barnes, Grand Forks, N. D.

Feb. 8-10—Milwaukee, Wis., Convention and Exhibition, Wisconsin Retail Hardware Association; P. J. Jacobs, Secretary, Stevens Point, Wis.

Feb. 8-11—Flint, Mich., Automobile Show, Flint Automobile Dealers' Association.

Feb. 9-16—Kansas City, Mo., Kansas City Motor Car Dealers' Association.

Feb. 11-18—Kansas City, Mo., Automobile Show, Kansas City Motor Car Dealers' Association, Overland Building; Manager, E. E. Peake.

Feb. 11-18—Atlanta, Ga., Second Annual Great Southern Automobile Show, Passenger Cars, Trucks and Accessories, Atlanta Automobile Association, Auditorium Armory; Show Manager, Virgil W. Shepard, 305 Connolly Building.

Feb. 11-18—San Francisco, Cal., Sixth Pacific Automobile Show, Motor Car Dealers' Association of San Francisco, Exposition Auditorium; Passenger Cars, Trucks, Tractors and Accessories; G. A. Wahlgreen, Manager, 215 Humboldt Bank Building.

Feb. 12—Madison, Wis., Ninth Annual Show, Automobile Dealer Division, Association of Commerce; Passenger Cars, Trucks and Accessories; Don W. Mowry, Manager, Cartwell Building.

Feb. 14-16—Chicago, Ill., Convention, Illinois Retail Hardware Association, Hotel Sherman; Leon D. Nish, Secretary, Elgin, Ill.

Feb. 14-17—Philadelphia, Pa., 21st Annual Exhibit and Convention, Pennsylvania & Atlantic Seaboard Hardware Association, Inc., Commercial Museum; Automobile Accessories, Etc.; Sharon E. Jones, Secretary, 1314 Fulton Building, Pittsburgh.

Feb. 14-17—St. Paul, Minn., Convention, Minnesota Retail Hardware Association; H. O. Roberts, Secretary, 1030 Metropolitan Life Building, Minneapolis.

Feb. 14-18—Kalamazoo, Mich., Automobile Show, Kalamazoo Automobile Dealers' Association.

Feb. 17-28—Trenton, N. J., Automobile Show, Trenton Automobile Trade Association, Second Infantry Armory; Manager, Frederick Petry, Jr.

Feb. 18-25—Hartford, Conn., Automobile Show, Hartford Automobile Dealers' Association, State Armory; Manager, Arthur Fifoot.

Feb. 18-25—Albany, N. Y., Automobile Show, Automobile Dealers' Association, State Armory.

Feb. 20-25—Bethlehem, Pa., Automobile and Accessory Show, Bethlehem Trade Association; Manager, J. L. Elliott.

Feb. 20-25—Grand Rapids, Mich., Automobile Show, Passenger Car Dealers' Association, Furniture Exhibition Building; Manager, M. D. Elgin.

(Continued on Page 42)

Hauls Glass Successfully

Special Body on Which Material Is Placed in Upright Position at Convenient Height Combines with Packard Chassis to Facilitate Handling of Fragile Product.

PLATE glass in large sheets for windows is believed to be the most subject to breakage of any of the many fragile commodities now hauled by motor truck. The adaptation of the motor truck to glass carrying is a problem that has long puzzled body builders. The main difficulty in the construction of a satisfactory body has been to get the floor low enough without underslinging the frame.

MANUFACTURERS of plate glass who have tried the underslinging method state that it has many drawbacks and is never entirely satisfactory when put in actual operation.

The Sharp Partridge Co., a Chicago dealer in plate glass, has worked out the most successful glass carrying truck body that has been brought to light. It is mounted on a size EC Packard truck chassis and has thus far met every requirement exacted by the great bulk, awkward shape and extreme fragility of plate glass in transit.

The size of the wheels and method of spring suspension on Packard trucks made the installation possible. When loaded the frame is $29\frac{5}{8}$ inches from the ground. To this must be added the height of the one-inch floor board and two-inch cross member on which the body is mounted. This makes the floor $32\frac{5}{8}$ inches from the ground. The illustration of the rear end of the truck shows the details of this construction.

The Proper Floor Height.

The height of the floor from the ground is just the normal height of man's hand. Consequently the loading and unloading of the truck is greatly facilitated as it is easier for the glass men to work. Of course, the old idea was that the closer to the ground the glass came off or went on the truck the better, as it

eliminated the chances of droppage.

This well known and generally accepted theory, however, has been disproved in the present instance, for in all the months the Sharp Partridge Co. has been operating its truck it has never had a bit of trouble from this source. Officials of the company state that the greater facility for working efficiently more than offsets any fancied advantage which might be gained by having the floor lower. In other words, the work and experience with this equipment has shown the heads of the business that they have the logical body for handling their product.

No Glass Broken.

"To date," said Mr. Partridge recently in discussing the truck and body, "no matter what the height or size of the glass carried, not a single piece has been broken while in transit on our Packard truck. The com-

bination of the torque arm and radius rods, together with the semi-rigid, cold-rolled frame of the Packard truck is largely responsible for this record."

The wheelbase of the truck is 14 feet and the frame length 16 feet. In order to supplement the easy riding of the truck it is also fitted with Sewell cushion wheels. These supply a resiliency in addition to that of the springs which successfully obviates the possibility of breakage during transit.

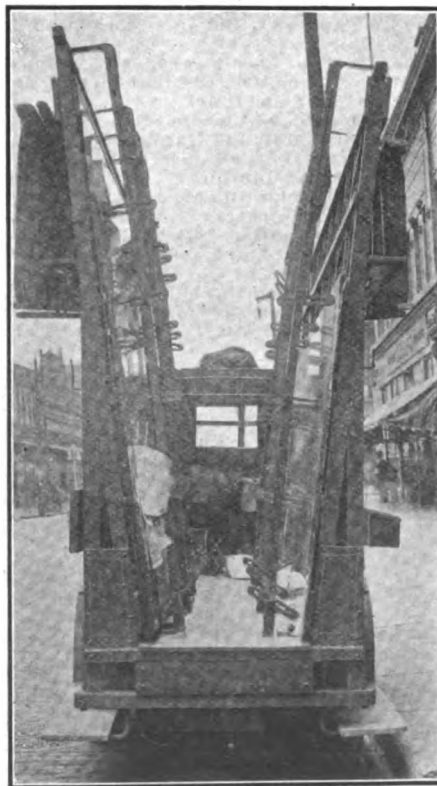
Vertical Loading Advantages.

One of the most important advantages incorporated in the construction of this body is the fact that the sheets of plate glass are loaded into it in a vertical position instead of being placed horizontally. This means that sheets of plate glass of large size can be carried on this body although the latter is only of ordinary width and is therefore easy to manoeuver.

ARMORED MAIL TRUCK.

Designated as an additional precautionary measure in the campaign against mail thefts now being waged by the Post Office department, the first armored mail truck was recently placed in service in New York, following an inspection at the Federal building by Postmaster Thornton, Superintendent of Mails Johnson and Captain McClure, in charge of the Marine Guard.

The new machine is protected by steel plates and has a bullet-proof windshield. It was designed by F. A. Fay, a draughtsman in the Motor Vehicle department. In construction it is practically the same as the regular mail truck now in use except that it is covered on front, back, top, bottom and sides with a sheet of bullet-proof steel one-eighth inch in thickness.

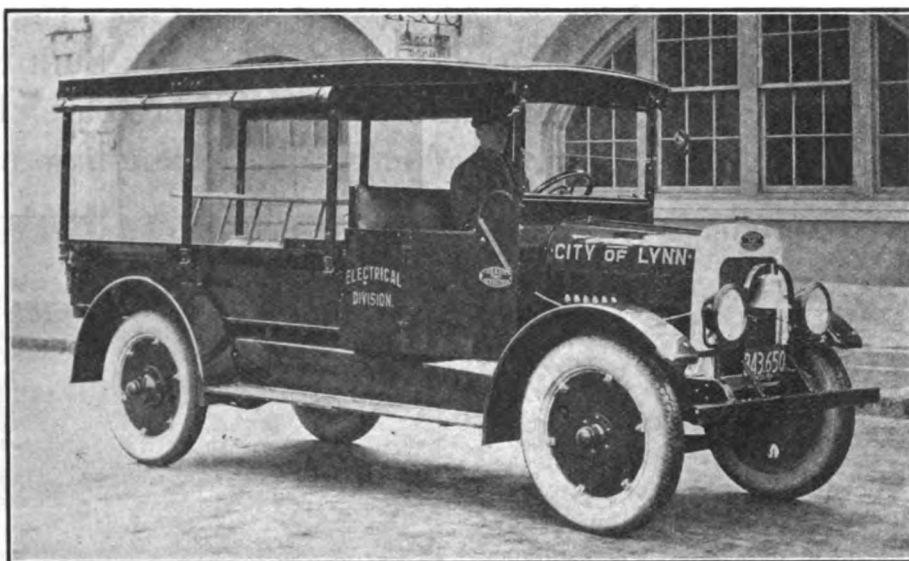


Breakage Danger Is Minimized by This Method of Glass Haulage.

KEEPS FIRE SIGNALS IN ORDER

A PIONEER motor truck manufactured by the Gramm-Bernstein Motor Truck Co., Lima, O., is giving unusual results in the electrical division of the fire department of the city of Lynn.

THE truck is stationed at the Franklin street station and makes all of the fire alarms and police signals to look after the wiring of each department. The truck has now been in service about three months and has been satisfactory; it is considered about the fastest wagon in the fire department. The men who operate it are more than pleased with the truck and the city officials, from the mayor down the list, are very much gratified at the purchase, and when



Every Great City Depends on Alarm Systems for Protection from Fire and Speedy Attention to Repairs Is Often Necessary.

inquiries are made the answer is the best of satisfaction in the work invariably that the truck is giving for which it is used.

H. B. SHOP AID OUTFIT EFFICIENT

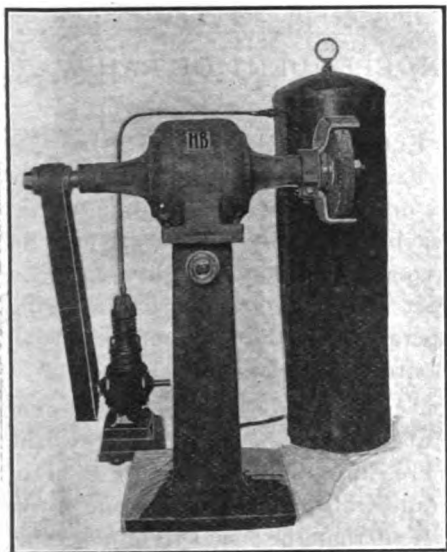
THE H. B. Shop Aid Outfit is a most useful outfit in a shop. It can be used for operating a line shaft, air compressor, drill press, etc., and also to buff tires and

can be moved readily to any part of the shop for power or grinding purposes. It may be equipped with an automatic switch in the compressor, which insures constant air pressure in the lines.

The Shop Aid outfit weighs 430 pounds and is equipped with a two-horsepower ball-bearing, heavy-duty motor, pulley extension, nuts and clamps. No grinding wheels are furnished, as every shop has different needs.

This outfit is furnished on the easy monthly payment plan, which is helpful to the new shop with heavy starting expenses. This equipment is claimed to earn its own way.

The Hobart Brothers Co., Troy, O., manufacturer, will gladly send further information.



A Useful Machine That Will Be a Boon to Many Shop Owners.

grind castings at the same time. The pulley equipment can readily be removed, leaving a sturdy two-horsepower buffer or grinder. The heavy-duty motor starts under full load. The ball bearings save power. A heavy weight stand prevents vibration and insures quiet operation. It

body is ingeniously arranged so that a man can climb up a ladder-like arrangement, bringing him to a height of 10 feet from the ground, and giving him a commanding view



This Light Truck Chassis Is Used in an Unusual Manner.

Unique Photo-Truck

TO GET the maximum of speed in taking photographs of news events and developing the negatives, progressive photographers of Atlantic City, N. J., have constructed on a Dodge Brothers chassis a special body in the form of a giant graflex camera. The interior of the

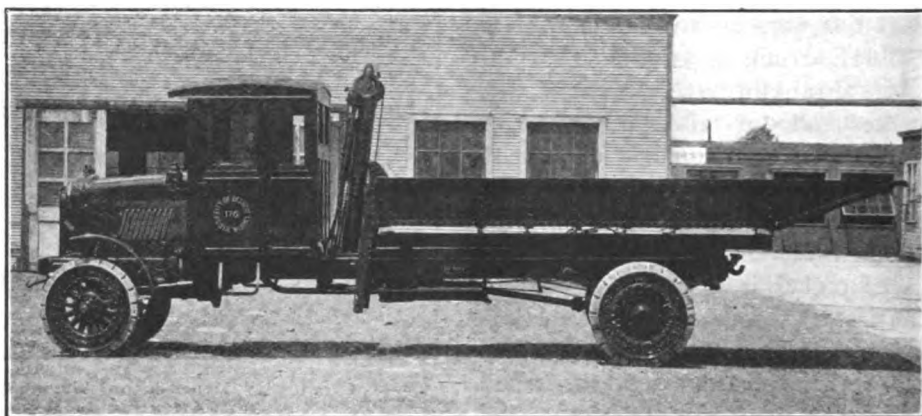
of any events which may be taking place. The body is also used as a dark room in which negatives may be developed and finished, guaranteeing speedy service, which would otherwise be impossible.

The "graflex wagon" operates at a high speed when it is wanted.

Designed for Garbage Removal

Newly Developed Denby Truck Built on Model 27
Chassis with 202 Inch Wheelbase Is Especially
Adapted to Facilitate Handling of Refuse.

THE motor truck plays a very important part now a days in the expeditious removal of a big city's garbage. Speed and ease of handling are especially necessary during the hot summer months. The Denby Motor Truck Co. has recently installed, with the garbage department of the city of Detroit, a Model 27, four-ton Denby, with a wheelbase of 202 inches, equipped with special body and hoist that is the result of a very careful study of the conditions imposed by such work.



Clean Dumping Is Provided for in the Construction of This Body by the Use of a Special Woods Hoist with an Extremely Long Piston.

ONE of the most important facts considered was that the body should be dumped absolutely clean, thereby insuring better sanitation at all times. In order to properly elevate the body a special Woods hoist was used that carried a 61-inch piston. The extreme length of this piston made a 51-degree elevating angle possible, which positively clears the body of all residue. It is worthy of note that in designing and manufacturing this special hoist the Woods people have incorporated some very desirable features. In order to allow the quick return of the body after dumping an extra expansion chamber had to be arranged for, and this was accomplished by the use of auxiliary tube. The hoisting apparatus is connected directly with the transmission through a power take-off and control of the entire mechanism is obtained from the driver's seat.

The body is of such construction that leakage is impossible and when covered exhibits nothing of its unusual load. An interesting feature in body construction was obtained by the use of one solid sheet of boiler steel for the front end, bottom and lip of the body. No joint is present at any point, thereby insuring extreme ease in

dumping the load. All rivets are countersunk and brazed and in order to prevent leakage all joints were welded. The body is 16 feet long and handles 7800 pounds every load, working 16 hours daily with two shifts of men. As is usually the case with dump jobs a steel retaining cable guards against the body being raised too far and on this particular job a very unique use was made of the cable. Enough slack was allowed in the cable so that when the hoist had performed its full duty the cable caught the body up sharply enough so that all of the remaining refuse was snapped out.

Sewell cushion wheels equipped with Kelly caterpillar tires add greatly to the appearance of the unusually sturdy, clean-cut Denby chassis. Comfort and protection for driver and helpers is secured by the installation of a special three-man enclosed cab of the all-weather type. Electric lights, front and rear, and generator and battery equipment are added features. A trailer draw bar attachment and towing hooks make additional load equipment possible at all times. The entire chassis is protected by an Alemite lubricating system, insuring proper care of the oil needs of the truck. An odometer gives correct mileage and enables the department to keep a very close

tab on the operating costs of the equipment.

H. W. Collins, superintendent of the Detroit city garbage department, expresses himself as being extremely well satisfied with the installation, due to the adaptability of the Denby to so properly execute its duties in this important work.

INDEPENDENT OF RAILWAY.

LOS ANGELES, CAL., Jan. 13. —Facilitating the quick delivery of its products to outlying communities reached only by comparatively infrequent railway freight service a fleet of White trucks is now being operated by the Schumacher Wall Board Co. of Los Angeles.

According to Earl Schmidt, general manager of that company, the increasing demand for these high-grade wall boards has become so insistent that the usual freight service is often entirely inadequate. "After trying out the plan of using motor truck transportation," he says, "it was found that this method was not only more dependable, but was much cheaper. As a result additions have been made to their original truck equipment until they are now prepared to handle the bulk of deliveries independently of the railroads."

HERE and THERE

Government Seeks to Solve Problem of Heavy Motor Trucks

Annual Report, Bureau of Public Roads, Suggests Regulation of Unusually Heavy Commercial Vehicles or Restriction to Certain Designated Roads.

WASHINGTON, D. C., Jan. 10.—The proper regulation of unusually large motor trucks because of their wear and tear to the nation's highways, or of restricting their use to certain roads designed to accommodate them, is suggested for consideration in the annual report of the Bureau of Public Roads, United States Department of Agriculture. The bureau, under whose supervision federal aid funds totalling \$200,000,000 have been expended on highways costing \$467,000,000 during the past five fiscal years, asserts that the problem of the heavy motor truck is one of prime importance, pressing each year with more weight for solution, which, while not to be hastily solved, ultimately must be met squarely and disposed of.

"The reduced unit cost of operation which follows from the transportation of commodities in greater bulk tends to promote the development and use of vehicles of the largest capacity which can be used to advantage," the bureau says. "It is desirable to gain this advantage, if it is actually an advantage, but it is this point which is seriously in doubt. The doubt arises from the fact that the roads which are adequate for traffic of automobiles and light trucks are entirely unable to support the weight of the heavier trucks, and to build roads which will carry the heavy vehicles will greatly increase the costs of construction.

"Whether the operation of the heavier vehicles shall be restricted to a class of roads especially designed to accommodate them, or

whether all roads shall be strengthened to provide for unrestricted use, or whether the third alternative shall be adopted and the operation of the heavier trucks prohibited, will depend upon the relation which is found to exist between reduced operating cost and increased cost of construction.

"The situation presents an economic problem of the first importance which is not to be hastily solved, but which must nevertheless be met and disposed of. To do so demands a careful weighing of the effects of the several possible solutions with a view to the selection of that one which, in the long run, will serve best to accomplish the one desirable end—the improvement of our means of transportation.

"The prime importance of an accurate knowledge of the weights of the vehicles which are to use the roads constructed is well illustrated by the experience of one of the states in which the Bureau of Public Roads made an extensive investigation during the past year.

"Ten years ago this state set out upon the construction of a system of roads. The roads were designed and built to meet all the reasonable demands of the traffic which then could be foreseen. In the brief time which has elapsed roads have been constructed which penetrate to all parts of the state, some of which, however, have been seriously damaged by heavy motor vehicles, the use of which could not have been foreseen when the roads were constructed.

"Our investigation reveals that in this case the return from the roads in the reduction in the cost of transportation and in the development of the territory they traverse has undoubtedly compensated the loss resulting from their destruction; but it is not by any means certain that the outcome will be so fortunate under other conditions.

"For the security of the enormous investment which is being made by the states and federal government it is imperative that this question of the duty which the roads will be called upon to render in the future shall be definitely determined. A clearer conception of the relative economy of heavy and light vehicles can be gained by careful study."

The bureau at the present time is engaged in conducting investigations designed to determine accurately the load-carrying capabilities of various kinds of roads, of various thicknesses upon different kinds of sub-soils—a study which will yield valuable information in meeting the problem outlined above. These experiments are being conducted in various sections of the country, in cooperation with state and highway departments, and at the bureau's experiment stations. Another problem presenting itself for solution and under investigation is the variance of the classes of traffic to be served in different localities. Pointing out that the demand for good roads comes from all classes of highway users, the bureau asserts:

"The demand of the farmer is for roads from the shipping points and agricultural centers to the surrounding producing areas—farm-to-market roads. The manufacturer and city merchant ask principally for roads which will facilitate the transportation of raw materials and manufactured commodities which flow to and from the cities. The tourist

(Continued on Page 35.)

May Save More Than a Billion in Income Tax Returns

Far-Reaching Provision of Fordney Act Allows Exemption on New Equipment Purchased by Manufacturers to Build War Supplies.

NEW YORK, Jan. 15.—Buried in the mass of phrases that make up the federal taxation bill that recently became law is a provision that may save a billion dollars to American business, according to a statement made public by M. L. Seidman, tax expert of Seidman & Seidman, certified public accountant. To take advantage of this law Mr. Seidman emphasized, all claims will have to be submitted to the government before March 15, 1922.

This provision, Mr. Seidman said, is known as section 234, subsection 8, of the Fordney act, and provides, in effect, that: Any concern that installed new equipment to produce articles contributing to the prosecution of the war will be allowed to deduct from its income tax the difference between the cost of that equipment and its value after the war.

This far-reaching provision has been part of the federal taxation law since 1912, he added. Until now, however, very few took advantage of it, for it could not take effect until the official end of the war, which did not take place until July of last year. Moreover, in the new law just passed the provision was amended so as to become of immediate importance.

A clause was inserted requiring all those who wish to take advantage of the provision to file their claims not later than the time of filing their income tax returns for 1921. That is, claims of the amortization of war equipment must be prepared and submitted before March 15, 1922.

A billion dollars is a fair estimate of the amount of taxes which may be refunded under this provision, in the opinion of Mr. Seidman.

"Congress originally inserted this provision in the tax bill, I believe,

as a measure of justice to the business men who paid the heavy taxes imposed by the 1917 bill. Under that law many corporations paid an average tax of 75 per cent. on their profits. Congress probably realized that these profits were earned as a

TWO MILLION SFOR HIGHWAY BUILDING

HIGHWAY construction work involving an expenditure for good roads amounting to \$223,885,000 the coming spring and summer has been authorized in the states of the Middle West, Illinois, Missouri, South Dakota, Michigan, Colorado, Minnesota, Indiana, Iowa, Kansas, Nebraska, North Dakota and Wisconsin.

result of expensive additions to equipment, and that this equipment would depreciate after the war. Therefore, in justice to the taxpayers, it provided that the burden of amortization of cost of this equipment should be borne by the government.

"No statistics are available showing the extent of capital investments made to produce materials of value to the prosecution of the war, but it is known that these investments were extremely large. Largely as a result of these investments, \$2,800,000,000 was paid to the government in income and excess profits taxes during 1918.

Allows Broad Interpretation.

"The phrase, 'articles contributing to the prosecution of the war with the German government,' can be interpreted so as to include a great many things not ordinarily considered war materials. In fact, every organization that was classified as an industry essential to the prosecution of the war may file an amor-

tization claim. Even chewing gum has been held to be a war necessity. It is possible, therefore, that a large part of the depreciation in value of business properties that has taken place during the post-war readjustment can be considered subject to section 234, subsection 8. I think that a billion dollars is a fair estimate at the amount of this depreciation.

"Much depends, of course, upon the regulations adopted by the commissioner of internal revenue for the execution of this provision. Business concerns who wish to take advantage of the law should not, however, wait for the issuance of these regulations. They should start immediately to prepare estimates of the amortization of their property, so that they can present their claims before March 15, 1922."

Section 234, subsection 8, of the Fordney act is quoted herewith, so that business men may judge its importance for themselves:

"In the case of buildings, machinery, equipment or other facilities constructed, erected, installed or acquired on or after April 6, 1917, for the production of articles contributing to the prosecution of the war against the German government, * * * there shall be allowed, for any taxable year ending March, 1924 (if claim, therefore, was made at the time of filing returns for the taxable years 1918, 1919, 1920 or 1921, a reasonable deduction for the amortization of such part of the cost of such facilities or vessels as has been borne by the taxpayer * * * At any time before March 3, 1924, the commissioner (of internal revenue) may, and at the request of the taxpayer, shall reexamine the return, and if he then finds as a result of an appraisal, or from other evidence that the deduction originally allowed was incorrect, the income, war profits or excess profits taxes for the year or years affected shall be redetermined, and the amount of tax due upon such redetermination, if any, shall be paid upon notice and demand by the collector, or the amount of tax overpaid, if any, shall be refunded to the taxpayer."

American Good Roads Congress Meets

Twelfth Annual Session Will Be Held at Coliseum, Chicago, Jan. 16 to 20.

CHICAGO, ILL., Jan. 14.—The 12th annual meeting of the American Good Roads Congress will be held at the Coliseum, Chicago, Ill., Jan. 16 to 20, inclusive. Many prominent speakers have been secured by the management of the convention, which has prepared the following attractive programme:

PUBLIC SESSION.

Invocation.
Announcement of convention committees:

Address of welcome on behalf of the city of Chicago by the mayor.

Response on behalf of the American Road Builders' association by the president.

ADDRESSES.

Session Devoted to Bituminous Roads.

"Bituminous Foundations," Hugh W. Skidmore, C. E., Chicago, Paving Laboratory.

"Selection of Bituminous Wearing Course," C. M. Pinckney, chief engineer, Bureau of Highways, Borough of Manhattan, New York City.

"Utilization of Local Material for Mineral Aggregate," Major W. A. Welch, chief engineer, Palisades Interstate Park Commission, New York.

"Asphalt Specifications," L. M. Law, chief chemist, New Orleans Refining Co.

"Specifications of Mineral Aggregates," Roy M. Green, manager, Western Laboratories, Lincoln, Neb.

"Controversial Construction Requirements in Specifications," Bruce Aldrich, Toronto, Canada.

"A Simple Graphic Method of Proportioning Sands for Sheet Asphalt Mixtures," Prevost Hubbard, chemical engineer, the Asphalt association, New York City.

Session Devoted to Portland Cement Concrete Roads.

"The Selection of the Mineral Aggregate for a Portland Cement Concrete Road," John H. Mullen, chief engineer, State Highway Department of Minnesota.

"Design of Concrete Roads for Heavy Traffic," W. D. Uhler, chief engineer, Pennsylvania State Highway Department.

"Inspection and Control of Materials for Concrete Roads," R. W. Crum, state testing engineer, Iowa State Highway Commission.

"Importance of Surface Finish and Methods of Control," H. E. Breed, consulting engineer, New York City.

"Single Track Concrete Roads for the Average County," P. C. McArdle, county highway superintendent, Vermillion County, Danville, Ill.

"Pavements Widths for Highway Serving Large Cities," Edward N. Hines, chairman, Board of County Road Commissioners, Wayne County, Detroit, Mich.

Session Devoted to Common Roads.

"Common Roads," T. J. Wasser, state highway engineer, Trenton, N. J.

"A Systematic Study of Gravels for Road Purposes," Wallace F. Purrington, chemist and testing engineer, New Hampshire State Highway Department.

Session Devoted to Highway Financing.

"The Proposed Wisconsin Plan of Highway Finance," A. R. Hirst, chief highway

engineer, Wisconsin Highway Commission.

"The Minnesota Experience in Highway Financing," C. N. Babcock, commissioner of highways, Minnesota Highway Department.

Session Devoted to Highway Traffic and Highway Transportation.

"Truck Overloading, Its Relation to Road Construction and Maintenance," J. G. McKay, Ph. D., professor of economics, University of Wisconsin.

Session Devoted to Highway Research.

"Highway Research," W. K. Hatt, professor of engineering, Purdue University; director of research, National Research Council.

"The Illinois Experimental Road," Clifford Older, chief highway engineer, Department of Public Works, Illinois.

"Highway Researches and What the Results Indicate," A. T. Goldbeck, chief, testing division, United States Bureau of Public Roads, Washington, D. C.

"The Highway Outlook," Thomas H. MacDonald, chief, United States Bureau of Public Roads, Washington, D. C.

"Cost Keeping on Highway Construction," A. R. Losh, assistant chief of construction, United States Bureau of Public Roads, Washington, D. C.

"Development of Small Stream Valleys into Traffic Routes," Jay Downer, chief engineer, Bronx Parkway Commission, New York.

"Uniform Legislation as Affecting Highway Traffic and Highway Transport," D. C. Fenner, manager, public works department, International Motor Co., New York City.

"Construction and Maintenance of Earth Roads," George E. Johnson, secretary of public works, Lincoln, Neb.

"Highway Construction on the Pacific Coast," Herbert Nunn, state highway engineer, Salem, Ore.

"Cooperation of All Parties Interested in the Construction of a Modern Road," William Ord, manager, paving department, Lakewood Engineering Co., Cleveland, O.

"The Business End of a State Highway Department," Charles M. Upham, state highway engineer, North Carolina State Highway Commission.

"The Highway Contractor's Problems," H. H. Wilson, Winston Brothers, Muncy, Pa.

To Discuss Grade Crossings.

The elimination of grade crossings will be one of the phases considered. Out of 12,000 persons killed on the highways of the country last year, 7000 were struck down at grade crossings. Investigation has shown also that one motorist in every three is careless at grade crossings, approaching the railroad tracks at reckless speed and without taking due notice of approaching trains.

The Pennsylvania and South Pacific railroads, especially, have been heavy sufferers from grade crossing accidents. On the Southern Pacific line alone during the past three years 1909 motor cars and trucks were wrecked at grade crossings. In 490 cases, or more than 20 per cent., the motorists deliberately ran into the trains. In 122 instances auto plunged through the crossing gates.

(Continued on Next Page.)

To Finish Hudson Tube in Four Years

New Tunnel Will Divert Millions in Freight from Lighters to Motor Trucks.

NEW YORK, Jan. 12.—All the plans, forms of contracts and specifications for constructing a great tunnel for vehicles under the Hudson river have been agreed upon by the New York and New Jersey commission. Bids will be opened Feb. 7, ground will be broken early in March and the time limit for the completion of the work is Dec. 31, 1925.

The tubes are to be of cast iron, lined with concrete. They will have a capacity of 15,000,000 vehicles a year, or double the vehicular traffic which now crosses the Hudson on the ferry boats.

Shafts on the Manhattan side have been sunk at a cost of \$650,000 and the work has been paid for. Similar progress would have been made on the New Jersey bank if it had not been delayed by disagreements between the commissions.

Chief Engineer Holland expects that when the work of building the tunnel begins employment will be found for many thousands of men who are now idle. Completed and ready for operation, the tunnel will have cost \$28,669,000, equally divided between New York and New Jersey.

A financial statement prepared by the commissions shows the tunnel cost will be amortized in 11 years and that at the end of 20 years there will be a surplus to each state amounting to \$33,635,000 in addition to the tunnel.

The tunnel will follow a line from Canal street, Manhattan, and 12th street, Jersey City. It is expected to increase the facilities for commerce in the port of New York and to serve in a large degree to eliminate difficulties existing at present by permitting the prompt removal of freight from railroad yards in New Jersey without dependence upon lighters or other floating equipment.

Ten Per Cent. Cut for Agriculturists

Experimental Period to Follow New Rate on Farm, Range and Orchard Products.

WASHINGTON, D. C., Jan. 11.—The Interstate Commerce Commission recently authorized the steam roads to put a 10 per cent. cut on freight rates on practically all farm, range and orchard products in the United States, outside of New England.

Orders were issued allowing the railroads to disregard all the usual restrictions in making up the new rate schedules as well as such violations of the long-and-short-haul clause of the Interstate Commerce act as might be brought about by percentage reductions.

Permission is also given for putting the rates into effect on one-day notice "on as early a date and in as inexpensive a manner as possible," for a six months' experimental period. At the same time the order of the commission, under date of Oct. 20, is left standing, which requires an approximate 16½ per cent. rate decrease on the transportation of grain, grain products and hay throughout the entire trans-Mississippi district, which the railroads were later instructed to put into effect by Dec. 27.

Suggestions were made by the railroad executives, in applying to the commission, that the general 10 per cent. decrease in rates on agricultural products which they contemplated, should apply to western hay and grains as well as to the other commodities, and become a substitute for the 16½ per cent.

No mention of this point in the railroad procedure was made by the commission, except that grain, grain products and hay in western territory were omitted from the permissive orders accepting the general decrease.

Reductions in the New England territory, where the financial status of the carriers is held not to justify a full 10 per cent. decrease, were

also contemplated in the voluntary application last week, and in the commission's orders today; the roads concerned were given permission to make such decreases as they found possible, effective after a five-day notice period.

While the commission swept away all administrative barriers to the 10 per cent. decrease, it was pointed out that further steps would have to be taken by the railroad managements before the lower rate basis actually comes into effect. The commission's failure to consider the 10 per cent. decrease on grains and hay as a substitute for the greater reduction it previously had ordered, it was said, might bring about proceedings and conferences.

At the same time the commission's investigations into the reasonableness of the general level of transportation rates in the United States will begin next week, and if the railroads are disposed to withdraw their voluntary offer, the tariffs on the agricultural products may be left to adjudication in that proceeding.

(Continued from Preceding Page.)

Nine crossing flag men were struck down.

In 970 cases in which motorists ran in front of the trains 136 persons were killed and 405 were injured. In 490 cases motor cars stalled on the crossing and were demolished. Forty-three cars actually collided with the danger signals.

A total of \$4,500,000 was paid out in death claims by American insurance companies for the 12,000 persons killed on the highways last year. In addition to the fatalities there were 1,500,000 non-fatal injuries.

Automobile fatalities in 1918 were 9542. In 1919 the number increased to 9826. Considering the 12,000 accidents last year and basing their calculations on the experiences of St. Louis, Cleveland, New York, Chicago and other cities for the first six months of 1921 experts estimate that this year's fatalities on the highways will reach 15,000. A total of 690 persons were killed in New York during the same period.

Three Joint Drive to Be Standard

Engineers Will Gather Data on Important Subject with View to Uniformity.

NEW YORK, Jan. 13.—The use of larger and heavier motor trucks during the last few years for hauling miscellaneous kinds of freight has resulted in lengthening the wheelbase to such an extent that an additional support at or near the center of the propeller shaft has become necessary. Propeller shafts so supported are known as three-joint propeller shafts since three universal joints are used, one at the transmission, one at the differential and one at the central support. The increasing use of this type of drive has resulted in a great number of different designs for the rear end of the forward shaft on which the center bearing is mounted.

Realizing that the three-joint propeller shaft has been in use long enough to warrant standardizing the rear end of this forward shaft, the Society of Automotive Engineers was requested to undertake this work. The subject was assigned to the Truck Standards committee and a sub-division, consisting of J. R. Coleman of the Selden Motor Truck Co., H. B. Knap of the Packard Motor Car Co. and J. W. B. Pearce of the Spicer Manufacturing Co., was appointed to obtain information on present practice and to prepare a tentative standard.

A progress report was submitted by this sub-division in April, 1921, and it was discussed at the truck division meeting at that time. It was the consensus of opinion of the truck manufacturers represented that the adoption of a standard for the front shaft rear shaft ends was most desirable and would result in a considerable economy in manufacturing, assembling and servicing. A final report was therefore prepared and it will be considered at the S. A. E. Standards committee meeting to be held in the Engineering Societies building, New York City.

Handy Favors State Truck Control

Chairman Michigan Public Utilities Would "Protect Pioneer Interests."

GRAND RAPIDS, MICH., Jan. 14—"When the Legislature seeks the cooperation of this commission in drafting legislation for the regulation of motor truck transportation, this commission will recommend such legislation as will protect the pioneer stable and serviceable interests then engaged in it from unfair and unnecessary competition, to the end that a fair return may be received on the investment and a fair grade of service rendered to the public."

This was all the answer Sherman T. Handy, chairman of the Michigan Public Utilities commission, would make to a question as to the attitude of the commission on motor passenger and freight transportation, asked at the convention of the Michigan Highway Transport association here.

However, Mr. Handy's unofficial answers to numerous questions indicated his thoughts on this problem. Some of these answers were:

"The manufacturer owning and operating his own trucks in the transport of his own freight over long or short hauls could not be designated as a common carrier and therefore would not be subject to state regulation as administered by the commission.

"It is recognized that the highways, unlike railroad tracks, do not permit of the same restricted operation of vehicles, but inasmuch as two railroads would not be allowed to operate parallel to one another where such dual service was neither a public necessity nor economically sound, it is not likely that similar competition would be countenanced in motor transportation, all conditions being equal.

"So long as I am on this commission, a public utility in this state will be protected in a fair return on its investment. Where such a util-

MAXWELL MOTOR LOWERS PRICES

IMMEDIATELY effective, a price reduction of \$400 on all models of the Maxwell 1½-ton truck is announced by A. E. Barker, vice president and sales manager of the Maxwell Motor Corporation, Detroit.

ity receives more than a fair return, measures will be taken to effect the return of the excess to the public; if, on the other hand, the return is less than the utility should have, it will be given an opportunity to recoup."

GENERAL MOTORS CUTS.

PONTIAC, MICH., Jan. 13.—The General Motors Truck Co. has announced a substantial reduction on its line of heavy-duty trucks, becoming effective Jan. 1. These new prices represent a reduction from the original price of these models ranging from \$625 to \$1050 per chassis, and are as follows:

Two-ton (Model K 41), \$2775; 3 ½-ton (Model K 71), \$3950; five-ton (Model K 101), \$4350. The one-ton chassis of this series was recently reduced to \$1495.

In announcing these reductions, W. L. Day, president and general manager of the General Motors Truck Co., stated:

"These new prices are in keeping with the spirit of the times. There is greater need today for economical, efficient motor transportation than perhaps ever before. In fact, it is vitally essential to the future stability of business. The more extensive use of high-grade, dependable motor trucks at this time will assist materially in reducing delivery costs, which are big items in overhead expense in all lines of commercial and industrial activity.

"This saving that motor trucks effect will permit in turn the lowering of prices on the finished products, and thus create a healthy trade stimulus which will hasten the period of normalcy.

Transport Truck Co. Has New Line

Is Showing Six Models of Finely Equipped Specially Designed Freight Haulers.

MT. PLEASANT, MICH., Jan. 15.—The Transport Truck Co. opens the new year with a new and complete line of specialized trucks for every service, and a scale of new low prices so astonishing as to attract widespread attention even in this period of price adjustment. The models are built entirely of new, clean stock, and are priced on the basis of present costs.

The Transport announcement features six models, from a fast one-ton speed job to Model 75 for all duty in the five-ton range. The extraordinary amount of equipment included in the regular chassis price is also unusual.

The new line totals two more models than Transport has ever presented before. It is a striking index of the progress that has marked this aggressive organization from the beginning. Three years ago the first Transport trucks were just going on the market. Today with one of the finest and most completely equipped truck factories, the company is expanding its market wherever transportation is used.

Following are the new Transport models and prices:

Model 15, Rapid Transport, fast one-ton speed job, equipped with pneumatic tires, electric lights and starter, seat, windshield, fenders and running boards, \$1295; Model 25, 1½-ton, complete with electric lights, bumper, radiator guards, hubodometer and motometer, \$1495; Model 35, two-ton capacity, equipped with radius rods, drive shaft brake, four-speed transmission and electric lights, bumper, hubodometer and motometer, \$1885; Model 55, three-ton capacity (same equipment as Model 35), \$2385; Model 60, 3½-ton capacity (same equipment as Model 35), \$2585; Model 75, five-ton capacity (same equipment as Model 35), \$3485.

Highway Commission Adopts Plans

Indiana Solons, in Conference with Governor, Plan Uniform Cost State Highways.

INDIANAPOLIS, IND., Jan. 10.—Specifications designed to make brick and concrete roads constructed by the state more nearly of the same quality and nearer the same cost, have been agreed upon by Governor McCray and the state highway commission. They slightly increase the cost of concrete and slightly decrease that of brick roads, more nearly equalizing the problem of future state road building in Indiana. By permitting competitive bidding between builders of brick and concrete thoroughfares, the commission looks forward to universal reduction in the cost of all road materials. The new specifications, highway officials say, not only strengthen the position of future Hoosier highways, but also add to the durability of state-built roads in proportion to the increase in thickness of the road base as specified.

The highway commission has not changed its position relative to building stone and gravel roads, members say. Governor McCray made it plain at a recent conference with the commission that his attitude as regards the use of native materials for Hoosier roads was the same as announced months ago. He reiterated that these materials should predominate in future road construction by the state department, and again stated that when the state highway system of 4000 miles as now proposed is completed, not to exceed 30 per cent. of the entire mileage will be of the hard-surface type. He said that native stone and gravel would be used generally on all roads. Only hard surface is to be applied to the principal roads connecting the state's commercial and industrial centers, and only used within a radius of 15 to 20 miles of the larger cities.

The agreement to change the specifications marks a new era in

Hoosier road construction. In the past there was virtually no choice but to build the main market roads of concrete, due to the fact that the old specifications were not conducive to competition between the brick and concrete interests. Under the new specifications all materials will have fair competition, and it is very likely that some roads to be constructed in 1922 will be of brick, highway officials intimate.

The new specifications will be used for construction of 66 miles of

GENERAL MOTORS SUSPENDS BONUS

THE operation of the present bonus plan of the General Motors Corporation has been temporarily suspended, according to an announcement by Pierre S. du Pont, president of the company. The plan was adopted in 1918, but "experience gained during the actual operation indicated that it was desirable to make certain changes," and a committee has been appointed to make an exhaustive study of the matter, which is expected to require several months.

pavement, to be laid on the National road to complete that transcontinental highway across Indiana from Terre Haute to Richmond, and which will be expedited early in the new year. Receiving proposals for closing these gaps was contemplated for Dec. 14, but contract letting was postponed when it became apparent a change in specifications was necessary to bring about fair competition among the interests handling road materials.

The change in specifications comes as the direct result of the policy of Governor McCray and his determination to give Indiana the best possible road construction at minimum cost. In changing specifications the outstanding policy of the governor and the highway commission was that the quality of the roads should not be sacrificed.

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J. E. Gramlich Returns to Sanford Co.

Former Chief Engineer, Who Designed Heavy-Duty Models, Resumes Position.

SYRACUSE, N. Y., Jan. 14.—The announcement of the addition of a new light model and the return to the Sanford Motor Truck Co. of its former chief engineer, J. E. Gramlich, is of interest to the industry. Much of the credit of the great success of the Sanford heavy-duty trucks is due to Mr. Gramlich, who designed the present 2½, 3½ and five-ton models. These trucks have long since proved their capability in various parts of this country and in many foreign lands.

To supplement its line of heavy-duty trucks and to meet an insistent demand from dealers and owners for a light, strong and speedy truck, the Sanford Motor Truck Co. is bringing out a 1½-ton model with considerable overload capacity, and equipped with electric starting and lighting outfits, pneumatic cord tires and other modern devices, and capable of sustaining a speed of 25 miles an hour if necessary.

For many months Mr. Gramlich has been working on the new model, which promises to be the last word in design, construction and equipment. It is built for years of hard service, and to satisfy the need for a strong, compact and flexible truck, which will fill the bulk of practically all hauling demands save those suitable only to the strictly heavy-duty line. The new Sanford model will maintain the Sanford prestige for strength and dependability plus the desired speed also for the use of time-tested, standardized parts.

Mr. Gramlich is a graduate of Syracuse university and a pioneer motor truck engineer. He was for many years chief engineer of the Chase Motor Truck Co., and later went to the Sanford Motor Truck Co. in the same capacity. For the last two years he has acted as chief engineer for the Watson Wagon Works, builder of wagons and trucks.

Trade Information Bureaus Are Held to Be Legal*

Judge Carpenter Hands Down Notable Decision Affecting 3000 Associations Which Collect and Distribute Business Data to the Trade.

CHICAGO, ILL., Jan. 10.—Federal Judge Carpenter recently rendered a decision of vital importance to business men and trade associations.

The government charged that a conspiracy existed to restrain interstate commerce and to enhance and fix prices in violation of the Sherman anti-trust act by the exchange of trade information.

The court denied, for want of equity, the petition of the government for an injunction and thereby removed a cloud of suspicion from more than 3000 associations of business men and manufacturers who began exchanging important trade information under the direction of the war industries board and continued the practise because of its obvious benefits both to the trade and to the public.

The comprehensive decision of the court is an interesting review of the economics involved. It is expected that the opinion will remove much of the uncertainty that has existed regarding the legality of collecting and distributing trade information. The court's complete opinion should be carefully studied by all business men and members and officials of trade associations.

Trade Facts Exchange.

The Armstrong Bureau of Related Industries was the agency through which the linseed oil industry exchanged trade information. The government made no criminal charge, but it attempted to prove conspiracy to restrain interstate commerce and to enhance and fix prices. It was charged that this was done and that uniform prices were affected by the exchange of trade information and by the creation of certain freight zones.

A reading of the decision will convince the average business man that Judge Carpenter has made a profound study of the economics involved in the case and has realized, as he says in his opinion, that the exchange of market information among competitors is the modern method of making business a science rather than a pure gamble.

WILL HAVE NEW FLYING BOAT.

SECRETARY of the Navy Denby now has at his command a six-passenger flying boat recently constructed at the naval air craft factory in Philadelphia. The plane is maintained in Washington subject to orders from the cabinet officer. Two 400-horsepower Liberty motors form the power plant. The plane weighs 14,000 pounds and is capable of making 90 miles an hour. The hull contains a pilot's compartment and a cabin furnished with tables and chairs.

There is little question that the opinion will clear up much of the unfortunate uncertainty that has existed among business men as to the interpretation of the Sherman anti-trust laws and that it will be widely quoted.

Text of Decision.

The decision in full follows:

In this case the United States, pursuant to the powers and duties imposed upon it by the Sherman anti-trust act, challenged as a combination or conspiracy a contract between the defendants, linseed oil crushers and the Armstrong Bureau.

The defendant, Julian Armstrong,

in October 1918, organized the Linseed Oil Council and operated it as a member of the Armstrong Bureau. The purpose of the council and bureau was to collect and furnish to the various members current quotations on linseed oil, the record of sales of oil, including prices, statistics as to stock on hand, crop conditions at home and abroad, and other information of interest or value to the manufacturers of linseed oil. The Armstrong Bureau entered into contracts with certain of the defendants and agreed to furnish them the foregoing information for a consideration.

Pursuant to these contracts the various subscribers daily reported their price lists to the bureau, and promptly sent word of any change. Other information was also furnished from time to time. The statements received and collected by the bureau were immediately sent out to all the members of the association.

Information Held True.

The record discloses that the information collected and distributed by the bureau to its several members was of the kind which a sagacious business man secures, or endeavors to secure, in the operation of his enterprise. The information was true. The price lists furnished were made in the regular course of business, and offered in good faith to customers or prospective purchasers. There was no proof that the members of the association ever, at the bureau meetings or at any other place, discussed prices or made agreements with respect to prices, and there was no evidence that the prices asked by any of the subscribers were not in accordance with the market price of flaxseed, upon which the price of linseed oil was based.

Production was not limited during the period the bureau was in operation. There was no proof of division of territory. There was no proof that the prices asked by the individual defendants were not fixed by them upon their own judgment, considering all factors affecting supply and demand. There was no proof showing that any member was under the slightest obligation or

*Compiled by Wm. M. Webster, Commissioner, A. E. A.

constraint to ask higher prices or maintain prices.

Tended Toward Uniformity.

The main argument for the United States is that the operation of the bureau tended towards a stabilization or uniformity of price on any given day, which was not due to competition, in accordance with economic law.

Many tables of statistics were offered in evidence and read to the court, from which there appeared at times a striking similarity in price, and that changes in prices were made by substantially all the members coincidentally.

It appears further that the price of linseed oil is controlled by the price of flaxseed, and that the flaxseed market is an open one, in which there are wide fluctuations as well as inactive periods.

The government has not shown that there was artificial regulation of price, either by definite oral or written agreement, or by tacit understanding.

Each individual crusher entering into a contract with the Armstrong bureau specifically and expressly agreed that all information reported to the bureau or distributed by it should at all times be purely statistical and pertain only to operations, and that the bureau should not be used to enable the constituent members to fix prices for the sale of linseed oil, cake or meal; to limit the sale, production or manufacture thereof, or to divide the territory in which it was to be sold.

Question of Conspiracy.

It is incumbent upon the government to show by the clear preponderance of the evidence that the defendants conspired to restrain interstate commerce. In the absence of direct proof of actual entering into of such a combination, and in the face of the denial under oath of the defendants that any such conspiracy or combination was entered into or made, the government must show that what the defendants did necessarily had the result of restraining trade, or, if it relies upon the circumstantial evidence to show that a conspiracy was actually entered into, it must show to the satisfac-

tion of the court that the circumstances upon which reliance is placed are entirely inconsistent with supposition of innocence.

The question involved is whether an association, such as an Armstrong agency (sometimes called the open price plan) is obnoxious to the anti-trust laws, whether or not there is anything inherently wrong in an agreement between producers in a certain line to furnish each other their prices and not to make any sale deviating from the price list without immediately notifying all the others.

Distinction Is Drawn.

Associations of merchants and manufacturers, boards of trade and exchanges are of great antiquity. Evidently such associations were not aimed at by the Sherman act, because they are not mentioned in the act. A distinction is sought to be drawn between the operations of an exchange and what was done by the defendants through the Armstrong bureau. An exchange sends out reports of actual sales. The Armstrong bureau gave out price lists. It is difficult to understand any ground for declaring one legal and the other illegal.

Every producer or merchant desires to obtain for his goods the highest price he can get. The price which he charges is always the highest which he believes the traffic will bear. He cannot charge, ordinarily, more than his competitors. His competitors' price fixes the point above which he cannot go. When the merchant fixes the price at the level of his competitors he is fixing it in competition with his rival just as much as though he had named a lower price. The competition of his rival has prevented him from charging a higher price.

"Essence of Competition."

If, on the other hand, he finds that he cannot move his goods at the price fixed by his competitors he will naturally lower the price, and this will establish a new level. This is the essence of what constitutes competition.

Quotations established by the sales on an exchange establish the market value at the time of the sale,

but not the market value the day after. The prices at which goods are offered for sale at any moment establish the market value at that moment.

"In those lines of merchandising where there are no exchanges the prices which producers and dealers put upon their goods constitute the market price. Cliquot's Champagne, 3 Wall. 114. In the trial of that case the judge charged the jury as follows:

"The market value of goods is the price at which the owner of the goods, or the producer, holds them for sale; the price at which they are freely offered in the market to all the world; such prices as dealers in the goods are willing to receive, and purchasers are made to pay, when the goods are bought and sold in the ordinary course of trade."

This charge was approved by the supreme court.

The above language was cited and approved by the supreme court in *Muser vs. Magone*, 155 U. S. 240, at page 249.

Question of Limitation.

If it is lawful for dealers to get together in an exchange and provide for a dissemination of the prices obtained on actual sales, why should it be unlawful for those producers and dealers in lines where no public exchange has been established, to make some provision for disseminating information of market value or prices? To put it in another way, why should they be limited to the dissemination of the market prices of yesterday, but not those of today?

In order to obtain efficiency in business, as well as in any other human activity, it is necessary to have reliable, immediate and adequate records. With the progress that has been made in the last century it is not to be expected that business alone stood still.

In the old days when at noon the business men of the community met in the village blacksmith shop, or in the evening met at the corner grocery, a man was supposed to carry in his head all the facts in regard to his business and never to disclose them to a competitor. Ade-

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STANDS SEVERE TESTS.

DETROIT, MICH., Jan. 12.—Commercial tests of first importance have been completed by the materials testing laboratory of the engineering college in connection with the development of a forged steel wheel which the Jefferson Forge Products Co. of Detroit is soon to place on the market.

According to Professor F. N. Menefee, who with Professor W. E. Lay conducted the tests, experts in the steel forging say that the wheel is a notable contribution to the art of forging in this country, and wheel men predict a great future for it.

In six months of testing in almost every conceivable way, the wheel showed favorably as compared to other wheels of standard types. It is forged, hub, spokes, felloe and brake drum, from one piece of steel, in the shape of a wooden wheel. It has an advantage over most wheels, according to Professor Menefee, in not being subject to swelling or breaking under any circumstances, and in possessing durability and simplicity because it is a single unit.

(Continued from Page 27.)

and that large section of our urban population whose direct interest in the rural roads is due to the opportunities for pleasurable recreation which they afford, are particularly concerned in the development of a system of smooth, hard-surfaced roads connecting the cities and points of natural interest. Thus, from the several classes, the demand is for roads to meet their particular requirements, while all units in an appreciation of the need for development of a system of roads which shall serve as a complete supplement to the railroads in the event of war.

"All these are proper demands, which must be accommodated as rapidly as the resources and means of construction will permit. Fortunately the more important requirements of each group may be met by the improvement of a relatively small part of our mileage of public roads."

Approved projects for federal aid in road building up to the end of the past fiscal year, the bureau states, cover 35,402 miles for the five-year period ending June 30 last, and involve the expenditure of \$587,000,000, of which nearly \$248,000,000 represents the federal government's contribution. The total mileage of completed federal aid projects during the past fiscal year was 3809, and the average cost per mile was \$13,035.

PROMISE PATENT OFFICE RELIEF

A DELEGATION of more than 40 manufacturers and patent attorneys, who are here seeking to remedy present bad conditions in the patent office, conferred with Representative Lampert, chairman of the Committee on Patents, and were assured that the bill to reorganize the Patent office would be called up on the first calendar day when it could be reached.

The delegation also visited Secretary Hoover, Acting Secretary Finney of the Interior department and other officials and received promises of co-operation.

The fact that the Patent office has nearly 60,000 applications unacted upon and that the examining force is largely inexperienced and untrained, owing to numerous resignations, was urged by the delegation as showing the necessity for speedy action.

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The new specifications provide that concrete must be laid eight inches in the center of the road, and seven inches on the sides. Previous specifications called for a uniform thickness of seven inches. The new specifications will make concrete roads slightly more costly and decrease to some extent the cost of brick roads.

The commission, under the new specifications, will require brick

MAKE RUT-PROOF TIRE.

AKRON, O., Jan. 12.—Ruts need menace the life of cord truck tires no longer now that Goodyear has perfected and is marketing a "rut-proof" cord pneumatic truck tire.

Spectacular proof that this tire is practicable was afforded by a test in which these tires on a Goodyear Heights bus were run against the curbing for 500 miles. And at the end of this strenuous test the side walls were not worn through.

Ordinary pneumatic truck tires were worn through the side walls in less than five miles when run against the curb.

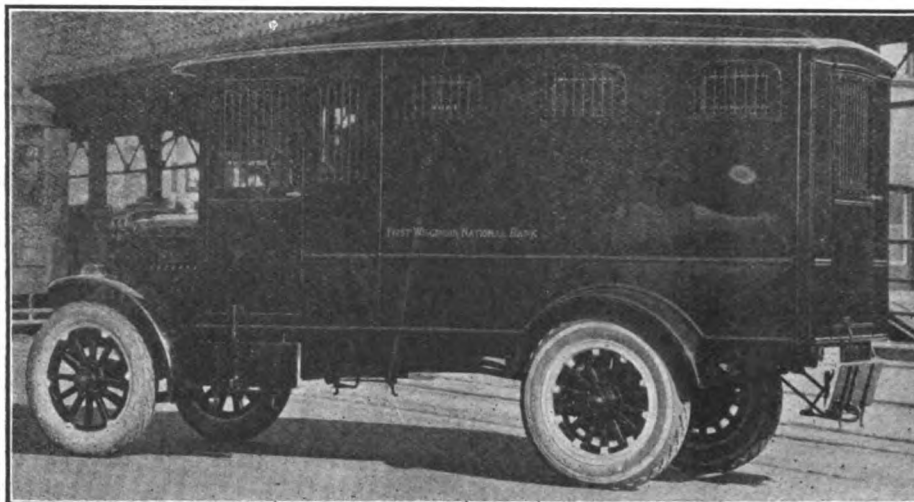
The Goodyear "rut-proof" pneumatic truck tire is the result of objections to the use of pneumatic truck tires in some rural districts because of the premature wear of side walls, coming from the contact of these large tires with the frozen ruts of winter and the sun-baked ruts of summer.

roads to have a five-inch base, with one-inch sand-cement cushion and three-inch vertical fiber brick with asphalt filler. By this change the road base is strengthened. The old specifications called for a four-inch base with grout filler of the monolithic type, but the new method is considered more durable.

Lawrence Lyons, department director, estimates that under the new specifications brick roads can be built approximately \$5000 a mile cheaper. He does not believe the added cost of concrete roads will be much greater than under the old specifications. Highway officials point out that under the new plans roads built from now on will be much more durable, and that by opening the proposals to competition, prices for actual construction will be lower.

J. T. Voshel of Chicago, district engineer of the federal bureau of roads, conferred with the governor and commission members. According to Mr. Lyons the new specifications will meet with the approval of the federal bureau and federal aid will be given.

Pay-Roll Thieves
and Other
Light-Fingered
Gentry Are
Having Hard
Sledding
These Days.



Modern Armored
Bank Bodies
Aid in Making
Their Jobs
Somewhat of a
Precarious
Occupation.

Armored Bank Body Foils Thieves

THE armored bank body shown in the illustration is 12 feet six inches by four feet six inches by five feet high over all. The body is fitted with one door at the rear and one door on each side at front.

THESE doors have folding tops so that when door is closed the steps fold up. The sides and rear are covered with No. 12 gauge steel. All seams and edges are covered by 1½-inch half oval. The front is fitted with a special heavy glass windshield. The three windows on each side in the body proper, as well as

the windows in the doors and cab, are of heavy French bevelled plate glass. The windows are protected with 7/16-inch cold rolled steel bars held in place by 1½ by 1½ by ¼ bound-in angles. The rear fenders are integral with the body. The roof is covered with 10-ounce black canvas duck. The frame proper is made of white oak and ash. The interior sides are covered with three-inch cypress ceiling and the roof with 1½-inch cypress and bass wood alternated, with natural wood or stained mahogany finish. The floor

is made of kiln-dried white oak. There are two hinged seats on the inside, accommodating three guards. The seats are furnished with leather cushions. The driver's seat is separated from the main body compartment with a wooden partition with a window protected with steel bars.

The body is painted on the outside as follows: One coat primer, two coats of lead, seven coats of filler, three coats of color, three coats of rubbing varnish and one coat of finish varnish. The weight of the body is approximately 2120 pounds.

Offers Technical Service to Truck Owners

THROUGH inquiries for advice from motor truck owners in every part of the country the technical service department of the United States Tire Co. has found that where chronic tire trouble is encountered in truck service the trouble is due in most cases to one of two reasons: Either the tire is not suited to the type of work in which it is used, or is misused by overloading, speeding or in some other way.

THE assistance of the service bureau is being sought in growing volume by truck owners who have tire problems to solve, or who want to be sure that their trucks have the proper kind of tires. One day recently the company re-

ceived from an owner of 40 trucks a request that the tire equipment of each truck be passed on.

In order that sufficient data may be available for the department's experts when any specific problem is under consideration, a questionnaire form has been prepared and mailed to most of the truck owners of the country. This should be filled out carefully by truck owners seeking information. Copies may be secured by addressing the Technical Service Department, United States Tire Co., 1790 Broadway, New York City.

This questionnaire shows that to deal adequately with a problem the department should know first the make, capacity, body type, wheel type and the number of years in service of the truck. Next, the

weight on the front and the rear axle of the combined chassis, body and the average pay or passenger load carried on the vehicle should be given. The sizes of tires on both front wheels should be stated, and whether solids or pneumatics are used. If pneumatics are used the sizes of rims, both front and rear, should be given.

Other items to be listed are the kind of material or merchandise hauled; the type of roads over which the vehicle operates, whether sand or soft clay, hard gravel or macadam, ordinary dirt, brick or asphalt; the average daily mileage travelled; the present average tire mileage, both front and rear, and tire troubles experienced in the past, both front and rear.

Efficiency of Trailer Guarantees Use

Properly Constructed Units Add to Pay Load of Truck,
Require Minimum of Power and Utilize Reserve or
Surplus Energy of Motor Vehicle.

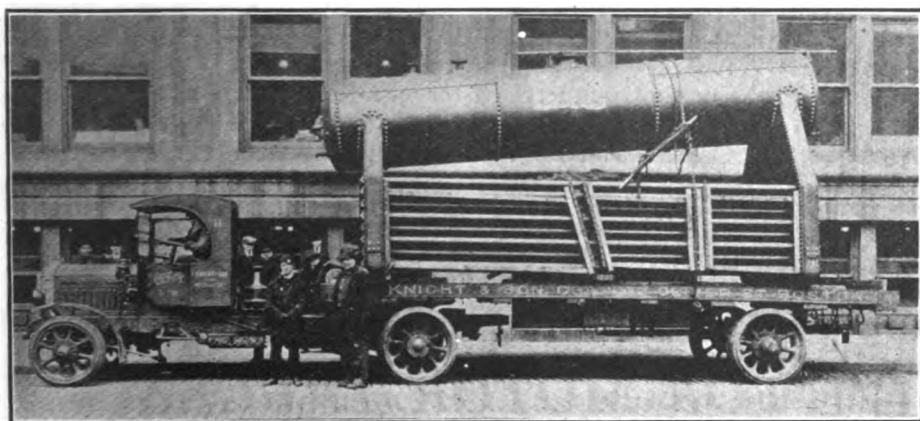
WHEREVER there is any hauling to be done—barring water and rail transportation—some type and size of trailer, it is claimed, will meet the requirements and will reduce the cost. Less power is required to haul a given load on a trailer than on a truck, because the trailer has no power plant or driving mechanism and therefore weighs only one-quarter to one-third as much as the truck. There is no loss of power in the trailer through friction in the transmission mechanism. For these reasons, it is customary to use a one-ton truck with a semi-trailer of two to three tons' capacity, a two-ton truck with a semi-trailer of four, five or six tons' capacity, and a five-ton truck with a semi-trailer of 10 to 15 tons' capacity.

THE trailer utilizes the reserve or surplus power of the motor vehicle. Any good automobile or motor truck that is not greatly over-

loading necessitates very long waits, the use of trailers effects a tremendous saving. While one trailer is left in the yard to have a load made up

pieces. Experience and observation along these lines have convinced trailer manufacturers that trailers, to be economical, practical and durable, call for real engineering design and skill in manufacture, and the trailer of the future will be constructed along the general lines of the modern truck as many are today.

The buyer of trailer equipment should exercise the same care in the selection of a trailer that he would if he were buying a motor truck. He should also make a careful study of his requirements to decide which type of trailer would best fit his particular business. It may be the two-wheel trailer with load balanced over the axle (which type is hauled behind the motor truck and does not interfere with the regular truck body), the conventional type of four-wheel trailer, or the semi-trailer, which is attached to the truck by means of a rocking fifth-wheel connection and can be instantly attached or detached. The latter type is the one in most general use.



Trailers Are Growing Fast in Popularity but Their Real Development Has Just Started—A Few Years Hence Will See Them in Universal Use.

rated by the manufacturer, has sufficient power to carry its load over ordinary roads and up moderate grades in high gear and to negotiate bad roads and grades of 20 to 25 per cent. in intermediate or low gear. When running on good roads and on the level, only a part of the power the engine can develop is used. There is enough surplus power to draw at least one trailer carrying a load equal to that on the motor vehicle itself, and often to pull a string of two or three such trailers.

Trailers make possible the use of motor truck in services where trucks cannot be used alone, as in hauling very long timbers, structural steel and pipe. In the lumber and other businesses where loading and un-

loading necessitates very long waits, the use of trailers effects a tremendous saving. While one trailer is left in the yard to have a load made up

the truck or tractor is on the road hauling another loaded trailer, and arriving at its destination drops the loaded trailer, hooks on to an empty and returns to the starting point, thus keeping both truck and driver on the road continuously. The trailer is by no means a makeshift vehicle, and it is a mistake to suppose that an ordinary horse-drawn wagon can be trailed with a load behind a motor truck and stand up successfully under such work for any length of time. Wagons are built for a speed of only three or four miles an hour and when hauled at 10 to 15 miles an hour by a motor truck the wheel bearings over-heat and the heavy impact due to road inequalities soon pound the wheels and other parts to

The principle of the trailer is old, but its application to motor vehicles is comparatively recent and its utility and economy are just beginning to be realized. A great opportunity exists for reducing haulage costs in many lines of business by the use of trailers. And a large proportion of these savings in transportation expense will be added, directly or indirectly, to profits.

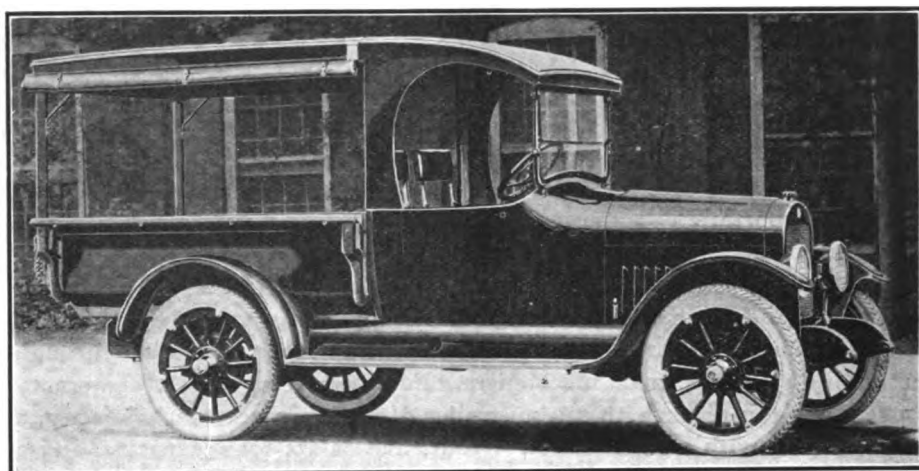
WHIPPLE QUILTS REPUBLIC.

ALMA, MICH., Jan. 12.—The retirement of A. J. Whipple as general sales manager has been announced by the Republic Truck Sales Corporation. Further announcement regarding his successor will be made shortly. It is reported that Mr. Whipple is joining another truck concern as sales manager.

Dort 1000-Pound Delivery Truck

THE Dort Motor Car Co., Flint, Mich., is placing in production a new 1000-pound delivery car which is claimed to be well suited to all classes of city and suburban delivery purposes within the capacity of the truck.

DORT truck dealers have for some time been demanding that the company add a delivery job to the line, enabling them to meet the demands of the trade for light delivery equipment. The new job has a wheelbase of 105½ inches, while the majority of the units used in its construction are the same as those found in the passenger cars. Four different models form the line, ranging in price from \$685 for the chassis to \$825 for the vehicle complete with driver's cab, steel body, canopy top and side curtains. The commercial chassis, known as No. 103, includes lamps, lamp brackets, front fenders, running boards, radiator, hood, windshield, seat frame, cowl board and instruments and body to the rear of the front seat, priced at \$685, f. o. b. factory. Number 105 is the same as 103, but includes driver's



City and Suburban Delivery Service Will Be Easily Handled by This New Dort Truck, Which Has a Capacity of 1000 Pounds.

cab and double-texture duck curtains front and rear, and is priced at \$715 f. o. b. Number 107 is the same as No. 105, but includes an all-steel express body without top and is priced at \$780 f. o. b.

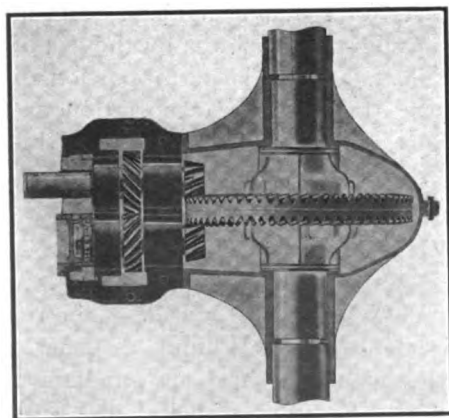
The wheelbase of the commercial car is 2½ inches shorter than the passenger car, the springs are heavier and the radiator, hood and cowl are different, these being similar to those used on the old Dort cars. Otherwise the units used in the commercial chassis are the same

as those in the passenger car line.

These include among others, the following units: Four-cylinder removable head engine, 3½ by five inches; cone clutch, leather faced; Carter carburetor; Connecticut battery ignition; American-Bosch starting and lighting system; USL battery; three-speed transmission in a unit with engine; three-quarter floating rear axle; propeller shaft mounted on Timken roller bearings as well as the front wheels, and Hyatt high-duty rollers in rear hubs.

SPECIAL DRIVE FOR MOTOR TRUCKS

PENROD & WISSEL, automotive designer, 916 Race street, Cincinnati, O., is showing a recent development of a special drive for



Assembly of Special Drive.

motor trucks which employs a double bevel ring, two pinions and two spur gears cut spiral, meshed as shown in the illustration. The

inventor claims that two eight-tooth, five-pitch bevel pinions are sufficiently strong for use with a four by five, four-cylinder engine using standard transmission, giving an 8½ to one reduction with 13.6-inch ring gears, allowing 10½-inch road clearance on a two-ton truck fitted with 36-inch drive wheels. An axle for a one-ton truck fitted with 7¼ to one reduction utilizes 10¼-inch ring gears with an eight-tooth, 5½-pitch pinion.

Another advantage claimed is a complete herringbone balance of all gear thrusts caused by the helical angle of all gears and also complete balance of separation thrusts on the ring gears, allowing the use of cheaper bearings, a lighter case with at least as high efficiency as when only one set of helical bevels is used.

The two ring gears and bevel

pinions are interchangeable and the two spur gears are equal, but of opposite inclination of teeth. For trucks it is cheaper to make two helical bevel rings than one of the same strength, as the two and the elimination of gear thrusts allow the use of much cheaper bearings and case. It is claimed that the loss of power and extra wear from going through one more gear than in the single-bevel axle is more than compensated for by the elimination of gear thrusts and the consequent lessened strain on the case bearings.

Regarding the adjustment of this axle, the inventor states that it is entirely unnecessary after it is correctly assembled, as it will remain in adjustment, due to the balance of all gear thrusts. The ring gears may be ground to correct thickness after they are heat-treated.

Enhances Accuracy of Motor Finish

Newly Developed Standardized Lapping Tools, Result of Exhaustive Experiment, Said to Make High-Grade Precision Easy for Builders of Internal Combustion Engines

THE unusual call for precision work in large quantities during the recent war was responsible for some great strides in automotive manufacturing progress. This high-grade work was heretofore accomplished by tools which, by reason of their crude design, made the success of the workman depend very largely upon his skill. For this reason this class of work had always been confined to the tool room, because it had always been considered impractical for quantity pro-

duction. Recent developments along this line have resulted in the perfection of tools which have made it possible to reduce metals to the most accurate dimensions easily and quickly, thereby greatly increasing the output of super-finished work. A good example of this type of development is that effected in "lapping." This is a process that has been used for years in the finishing of fine precision gauges, where accuracy to .0005 of an inch or less was obtained.

THIS was desirable in the finishing of internal combustion motors, but it was always thought impractical, principally because of

abrasive renders highly skilled labor and months of experience unnecessary, allowing perfect lapping to be quickly and cheaply done in any shop with average shop or garage equipment. The replaceable shells are supplied in two grades, the use of which depends on the speed of cutting desired and the type of work.

The construction of R. & C. laps, as shown in the accompanying illustrations, is simple and sturdy. One section of the shell of the internal lap, as shown in Figure 1, has been removed to show the novel construction. The lap consists of a shank of the floating type, and an expanding device for adjusting the size, as well as taking up the wear, of the soft metal shell which is charged with the abrasive. During the expansion of the R. & C. lap, the diameter is kept constant throughout the length, assuring a true bore, free from bell mouthing or taper. This is absolutely necessary in lapping engine cylinders, and a condition not obtained with split-piston or other make-shift laps.

Many engineers have had the mistaken idea that during every lapping operation some of the abrasive always remains embedded in the surface being lapped, and have been reluctant to take the trouble to find out

definitely what really does happen. It has been proven recently, however, by conclusive tests that it is impossible to charge the surface being lapped if the lap is made of softer material, and for this reason the R. & C. lap shells are made of metals which, after the most exhaustive experiments, have proven to be the most suitable. They are softer than the surface to be lapped, overcoming the important objection to the split-piston or other make-shift lap.

The abrasive easily becomes embedded in the softer lap shell as it should, rather than in the surface of the cylinder wall, crank pin or other surface which is being lapped.

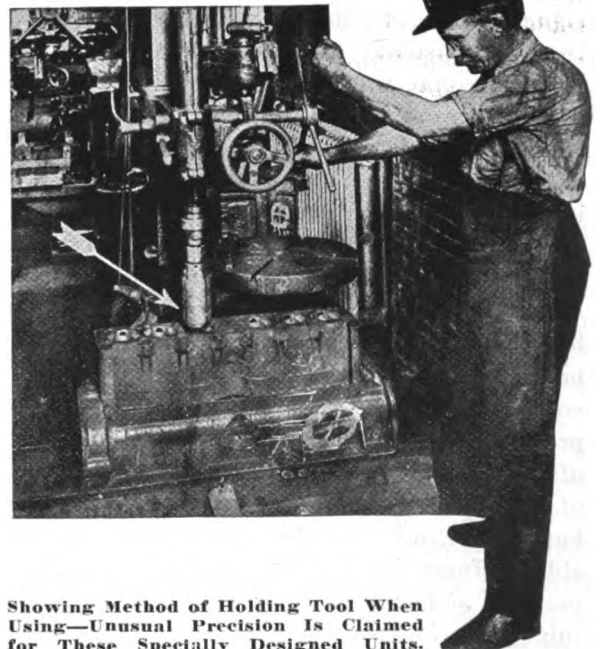
Another big advance in automo-



One of Several Lapping Tools
Made by R. & C. Lap Co.

the crudeness of the tools made for lapping and the meager knowledge existing regarding the correct abrasive.

The R. & C. Lap Co. of Davenport, Ia., has developed a line of standardized laps with interchangeable and replaceable shells and, through a great deal of experimental work, has perfected a lap which precludes all guessing and uncertainty. The laps are made for both external and internal use, in sizes from one-quarter-inch up. The design of the lap and the use of a standardized

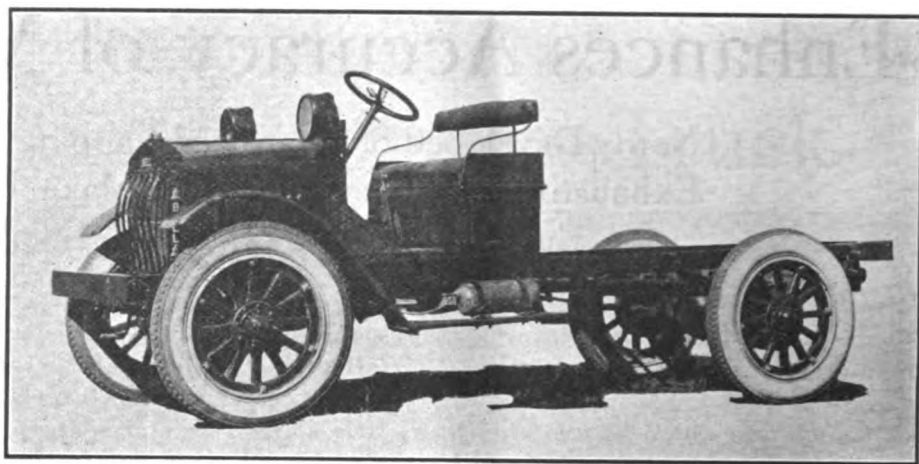


Showing Method of Holding Tool When
Using—Unusual Precision Is Claimed
for These Specially Designed Units.

tive refinement was made possible by this new method of lapping, and it is already employed by a few manufacturers of high-grade automobiles. This process makes unnecessary the salesman's advice to "Drive slowly the first 1000 miles, and you will add years to the life of your motor." The years are added when the motor is lapped. The even, glossy finish attained by 1000 miles of slow driving is obtained in from 30 seconds to two minutes per bore, depending upon the condition of the cylinder, and the purchaser of the car may drive at any speed he desires without danger of scoring the cylinders.

The crank shafts of automobile motors are generally given a limit of plus and minus .0005 of an inch on the crank pin and main bearing surfaces, this being considered as close as they can be held in quantity production. Frequently, however, inspection departments find crank shafts that vary an additional .0005 of an inch above or below the limits given, and instead of rejecting them, the connecting rods or bearings are fitted to the oversize or undersize surfaces; consequently the connecting rods must be marked and follow each individual crank shaft. This impedes production and, if any of the specially fitted parts become separated or mislaid, still more time is lost.

The R. & C. external lap was designed to overcome the above trouble. Instead of scraping or reaming connecting rods to each individual crank shaft, they are finished to a hardened and lapped plug and put in stock. The crank shaft is left .001 of an inch oversize, and is lapped to size within a .0001 or .0002-inch limit. No time is wasted when assembling the motor because by this method any crank shaft may be assembled with any set of connecting rods. The lapping process not only facilitates the manufacture of motors and the assembly of crank shafts and connecting rods, but also eliminates the objectionable stiffness found in new motors just out of factory, which are often ruined by inexperienced drivers.



Fully Equipped, This Truck Weighs 2550 Pounds—It Is Assembled from Proven Units—The Engine Is a Buda; the Power Plant Is Three-Point Suspension and the Eisemann Magneto with Impulse Starter Is Used.

Bell One-Ton Special

THE Bell Truck Sales Corporation, Ottumwa, Ia., gives the following description of its Bell one-ton special truck, which was placed on the market more than a year ago. The equipment includes driver's seat, worm drive, pneumatic cord tires and lights. The engine is a Buda, four-cylinder, cast in a block, detachable L-head type, with a bore of $3\frac{5}{8}$ inches and a stroke of $5\frac{1}{8}$ inches. The power plant is on a three-point suspension.

IT IS cooled by a centrifugal pump and fan. Ignition is from an Eisemann magneto equipped with an impulse starter. The oil is forced to all the bearings and important working parts of the engine by force. The Zenith carburetor is used and is operated by a throttle control on the steering column and accelerator.

To insure ample radiation this truck is supplied with an extra large radiator which can easily be disassembled as the tanks, core and sides are removable. The core is of the flat tubular type and has a high freezing resistance. The gear set is in a unit with the engine and is of

the selective sliding gear type with three speeds forward and one reverse. A multiple dry-disc clutch is used.

The final drive of this truck is of the worm type with the axle full floating. The emergency and service brakes which are expanding, are fully enclosed. The tire equipment is 35 by five-inch truck cords. The weight of the truck, with full equipment, is 2550 pounds. The high gear ratio is 7.2 to one. The chassis is lubricated by a high-pressure system.

This truck is also furnished as the Bell Contractor's Special, which has a 98-inch wheelbase.

(Continued from Page 11.)

vehicles will greatly increase the cost of construction."

The Bureau of Public Roads is now engaged in conducting investigations designed to determine accurately the load-carrying capabilities of various kinds of roads, of various thicknesses upon different kinds of subsoils. These experiments are being conducted in various sections of the country, in cooperation with state and highway departments, and at the bureau's experiment stations.

Another problem presenting it-

self for solution and under investigation is the variance of the classes of traffic to be served in different localities. Pointing out that the demand for good roads comes from all classes of highway users, the bureau says:

"The demand of the farmer is for roads from the shipping points and agricultural centers to the surrounding producing areas—farm-to-market roads. The manufacturer and city merchant want roads which will facilitate the transportation of raw materials and finished goods.

(Continued from Page 34.)

quate systems of accounting had not been devised. Overhead as a cost element in operation was unheard of. Business was run by the rule of thumb. Such days have gone by. The commercial enterprise today which is not so managed that its head can at any time know how large is his stock, the volume of his sales, the cost of operation, and the amount of his profit and loss, sooner or later will be distanced by his competitors.

Business Now Science.

It is because business is so much more complex, the volume so much greater, the margin of profit on single transactions so much less, that the merchants of today must have at instant command reliable and adequate information, immediately to be secured and more or less permanent in form. Business is no longer a game of chance, but a matter of scientific calculation.

A merchant cannot compete with another merchant unless he knows what he must compete against. A knowledge of what his competitor is charging is the first step in competition. It does not follow because one man knows the price which his competitor is asking, and he then fixes the same price, that his action is by agreement. If his competitor charges a high price he naturally will ask the same price if he thinks he can get it. It is absurd to imagine that every merchant does not endeavor to keep posted on the prices asked by his competitor. If he fails to keep posted he will find himself losing money. If his prices are too high his customers leave him. If too low he fails to reap the profit to which he is entitled. The government cannot seriously contend that it is the duty of every merchant to guard against his competitor, finding out what he is charging. It would be an impossibility. Nor is it wrong for a merchant to endeavor to find out what his rivals are charging. If he cannot get it directly and easily, he will necessarily get it indirectly and at a great expense and slowly. He must know in order to conduct his business properly; nor does the public profit by the mis-

takes of a merchant charging too much on the one hand or too little on the other, for want of such information. The mistakes would in all probability fall equally on either side.

Uniformity Not Conspiracy.

Quick and accurate information of what his competitors are charging naturally leads to uniformity in prices. But because one merchant charges the same price that the other merchant charges because he finds that he can get it, does not necessarily indicate that there is any agreement between them to charge the same price. As the supreme court said in the steel case, a uniformity in price does not prove a conspiracy.

What applies to sales for present delivery applies equally to sales for future delivery.

Much has been made by counsel for the government of the fact that prices of oil went up along with the price of flaxseed; that afterwards when flaxseed declined sharply the price of oil did not come down at the same rate, but declined at a much slower pace. The court will take judicial knowledge that for the past several months a decline in prices has been going on. The government has failed to show that the phenomenon of the price of oil declining at a slower rate than the price of flaxseed was not common in other lines, where the price of the raw materials has fallen. That the price of the finished product on a declining market will fall at a slower rate than the price of the raw material is natural, and therefore expected. The price of the finished material, under conceded economic rules in the market where there is competition, will depend upon the supply and demand of the finished material. The drop in the price of the raw material does not affect the supply of the finished material. Time must elapse before the supply of finished material is increased by the low prices of raw material, and until the supply of finished material is increased, assuming that the demand remains constant, no decline in price may be expected. When the price of raw material starts to go up, less of the fin-

ished material will be produced, and stoppage or slowing up of the manufacture of the finished material will be at once reflected in an increased price.

The court should not construe the acts of the defendants to be illegal when it can, with equal facility, ascribe them to an innocent intention.

Charged as "Stabilizer."

But it is charged by the government that the defendants themselves claim that the effect of the bureau was to stabilize prices. That is to say, as a result of accurate and instant knowledge on the part of producers, the price of linseed oil instead of varying sharply from day to day, as shown by the sales made, assumed an average price without the deviations. If these deviations before had been the result of real competition, based on accurate knowledge by the producers of the real market conditions, then the government is far from sustaining its contentions. The defendants, however, have shown, and their evidence is uncontradicted, that the deviations before existing were caused by the individual producers endeavoring to meet prices of their competitors which had never been made; and it is common in the trade for buyers to make false representations as to the prices made by other producers. Surely, such a condition is not the one that the Sherman act aims to foster.

The government was greatly disturbed by a statement in the defendant Ferry's books that the Armstrong bureau had brought about a stabilized market. This expression seems to have been a great bugaboo. Counsel for plaintiff would have the court believe that the term "stabilized market" means nothing other than uniform prices. Whatever the proper definition of the phrase, the record does not show that there was a stabilization or uniformity in prices.

The defendants contend, and I agree, that the term "stabilized market" means the obtaining and distribution of any accurate information that would enable crushers and buyers of linseed oil the better to un-

derstand the conditions of the flaxseed and oil market, to the end that the speculative hazards which formerly had worked injury to both seller and buyer would be minimized and eventually eliminated, and the economic law of supply and demand be more intelligently put into operation.

"Zone System" Criticised.

Complaint is made against what is called the "zone system" and differentials applying thereto. It is true the prices quoted had reference to certain well-defined territory, and the prices were accompanied by differentials to equalize the cost of railroad transportation. The record shows that these differentials were adopted after a thorough and intelligent investigation of freight rates from the base point to point of delivery, and the addition to the base price in the different zones was arrived at after a fair averaging of those freight rates into the designated territory.

Zoning for the purpose of fixing rates is not new. The Interstate Commerce commission permits it in regulating the charges to be made by railroads. It is not a perfect system, and there is always a certain amount of discrimination to those who live on or near the dividing line between zones, and I have no doubt a few buyers of oil may have been to some extent penalized, but every buyer had the option of purchasing f. o. b. point of manufacture, or f. o. b. point of delivery, and I must assume that the buyer would choose that f. o. b. point which seemed the most to his advantage.

The charge of the government that the zone differentials were adopted in order that the price charged for oil would be artificially enhanced and the defendant crushers consequently enriched, is not borne out by the evidence. There was no zone in which all the crushers did business, and the bulk of the finished product sold by the defendants was for delivery in zones carrying minimum freight differentials.

Cites Board of Trade Case.

Counsel for the government seeks to draw an inference of guilt from the admission of defendants that the

bureau allowed them to sleep nights. The only restraint which the rules of the bureau on their face impose is that the members agree not to deviate from their price lists without informing the other members at once by telegraph. At the close of each business day every member knew until the next day what the market was. It seems to me that the situation thus created is not dissimilar from that sustained by the United States supreme court in *Chicago Board of Trade vs. United States*, 246 U. S. 231. It is very evident that the supreme court does not believe that the Sherman act should prevent men from sleeping nights.

The Armstrong bureau was originated solely for the purpose of furnishing information not only to the linseed oil crushers, but to those interested in every other industry. It was a bureau of intelligence and one which makes for real rather than artificial competition in trade. There was no restriction placed upon any member. He was free to buy from and sell to whomever he chose. The bureau operated solely as to past transactions and wherever there is freedom of contract on the part of the constituent members there cannot be a violation of the Sherman act.

Not "Necessarily Obnoxious."

The prosecution, down deep, evidently believes that an association of producers or merchants must necessarily be obnoxious to the Sherman act because it affords an opportunity for the members to conspire to restrain trade.

Where there is such an association it is perfectly natural for members to express themselves as to conditions and prices; in fact, that is what the association is formed for, and these expressions have been seized upon by counsel as evidence to show that a corrupt agreement was actually made.

To my mind some of these expressions are evidence that no such agreement was in fact made, if they are evidence of anything. It would be perfectly natural, among a meeting of oil men, for some one to say that he thought prices ought to be

higher. The meaning conveyed by such an expression would be that the man was at a loss to understand why prices were not higher, taking into consideration the demand and supply and conditions of the trade. I might well say today that the weather ought to be cooler without laying myself open to the imputation that the temperature had been fixed by an agreement of mine.

Logic which assumes that because there is an opportunity to fix prices, therefore prices are fixed, is contrary to the genius and theory of our law. Every man is presumed to be innocent until he is proved to be guilty. If the Armstrong bureau is to be dissolved merely because it afforded an opportunity for the members to fix prices, then this court, with equal propriety, could be asked to dissolve any lunch club where business men meet. This theory hardly warrants discussion, and I would not mention it had I not been gravely urged in this case, that such was the underlying thought of the prosecution. It is the ancient fallax—post hoc propter hoc.

The bill will be dismissed for want of equity.

(Continued from Page 23.)

March 11-18—Bronx, N. Y., Bronx County Automobile Show, Passenger Cars, Trucks and Accessories, 105th Field Artillery Armory, 166th Street and Franklin Avenue; Manager, H. G. Stiles, 2483 Tiebout Avenue, Bronx.

March 11-18—Newark, N. J., Automobile Show, Newark Automobile Dealers' Association.

March 11-18—Boston Show, Mechanics' Building.

March 13-18—Boston, Mass., Automobile Salon, Boston Automobile Dealers' Association, Inc., Copley Plaza Hotel; Manager, Chester I. Campbell.

March 13-18—Omaha, Neb., Automobile Show, Omaha Automobile Trade Association, Auditorium; Manager, A. E. Waugh.

March 15-18—Port Huron, Mich., Automobile Show, Port Huron Automobile Dealers' Association.

March 21-22—Ypsilanti, Mich., Automobile Show, Ypsilanti Automobile Dealers' Association.

March 23—Philadelphia, Pa., Sectional Meeting, Society of Automotive Engineers.

March 24—Detroit, Mich., Meeting, Society of Automotive Engineers.

March 24-25—Ann Arbor, Mich., Automobile Show, Ann Arbor Automobile Dealers' Association.

March 27-April 1—Oklahoma City, Okla., Sixth Annual Automobile Show, Coliseum, Oklahoma City Motor Car Dealers' Association; Manager, Edgar T. Bell.

March 28-31—Benton Harbor, Mich., Automobile Show, Benton Harbor Automobile Dealers' Association.

March 31—Chicago, Ill., Mid-West Meeting, Society of Automotive Engineers, "Various Commercial Fuels and Their Relative Characteristics."

April—Buffalo, N. Y., Second Annual Motors and Sportmen's Show, Automobile Club of Buffalo; Manager, D. H. Lewis.

International Drive Method

AUTOMOBILE engineers have long desired some method of drive which would eliminate the troublesome differential gears and would allow the large bevel ring and pinion to transmit the power of the engine direct to the driving wheels without the use of intermediate gears. It is necessary to take into consideration, when devising a satisfactory method of drive, the slippage or slower turning of the inner driven wheel when rounding corners, turning the car and backing, otherwise unnecessary wear is caused on the tires. The conventional differential was early designed to handle this problem and does so in a highly satisfactory manner, but loses its driving effect when mud holes are encountered or in slippery going. The differential allows but one wheel to drive while the other makes no effort to turn if the car becomes bogged in a mud hole.

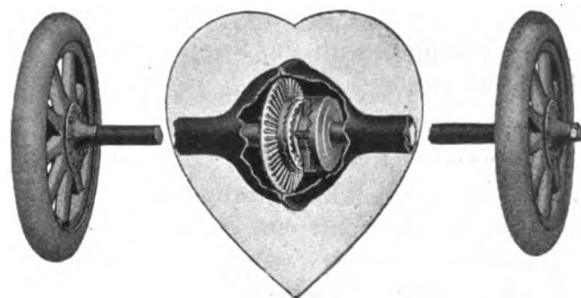
The object of the International

method of drive is to overcome this difficulty and to transmit the power equally to each wheel regardless of the condition of the road. Slower turning of the inner wheel is provided by a special double arm which causes double end cams to engage with teeth in the driving gears attached to the axle shafts. In rounded turns the inner driving wheel turns more slowly than the outer driving wheel, the cam freeing itself from the driving gear. Driving straight ahead or in reverse, both cams are locked in the direction of travel and the wheels revolve with equal velocity according to the speed of the engine and the speed gear in the gear box which is being used.

This type of drive, manufactured by the International Auto Drive Co., 629 East Pearl street, Cincinnati, O., is stated to be very popular with dealers, repair men and

others who wish to change over the differential drive and substitute a more positive method. The device, it is claimed, bears the approval of prominent automobile engineers, and has passed through the experimental stage and pronounced satisfactory.

In action the International drive is similar to that of the conventional differential, but differs from it in that both wheels are locked in all straight-away driving, releasing automatically when rounding turns. The installation is very simple as the conventional differential is removed and the International drive substituted.



Sold First Hydraulic Hoist Made by Gar Wood

J. H. SEGRAVES, distributor for the Pierce-Arrow Motor Car Co. in Bridgeport, Conn., tells the following interesting story of how he sold the first hydraulic hoist made by Gar Wood:

"In 1911 I was selling Pierce-Arrows in the Twin Cities. The Northwestern Fuel Co. of St. Paul, one of the biggest companies in the Northwest, had not yet given up horse and wagon delivery, therefore, it was necessary to convince them the motor truck was a real money maker. I succeeded in convincing them that they should install several motor trucks equipped with the old-style mechanical screw hoist. While a great deal of money was saved by the adoption of the trucks, the management complained of the manual exertion and the fact an extra man had to accompany the load to operate the man-power hoist. I promised them that on an additional purchase of trucks we would equip them with

power-driven hoists and let the motor do the work. I immediately took the matter up with the Pierce-Arrow Co., who had representatives attend every automobile show in the country and also sent men to Europe in the search for a power-driven type which I had promised, but we were unsuccessful in locating anything that would stand up. We then started experimenting and constructed some seven types of hoists, none of which proved successful.

"About this time it came to my attention that a young fellow in St. Paul, by the name of Gar Wood, claimed he had invented a principle which would do the work. My anxiety to make good with the Northwestern Fuel Co. spurred me to investigation and finally Mr. Wood, the inventor of the present hydraulic hoist, appeared with a crude miniature model consisting of a piece of 1½-inch gas piping, 15 inches long, which was used as a

cylinder, and a ½-inch piston rod with a small pump connected. He placed this miniature hoist under one side of a Pierce-Arrow touring car, which was lifted without any apparent effort. This convinced me that Mr. Wood had the proper idea and we arranged with him to build us a hoist.

"It is interesting to know that this first hand-made hoist was installed on Pierce-Arrow truck No. 35, and Mr. Saunders, president of the Northwestern Fuel Co., pronounced it the best method possible for reducing the cost of coal hauling. This installation was made in 1911 and when I visited Duluth in 1916 the hoist was still performing satisfactorily and I would not be surprised if it were in operation today.

"I might add that Gar Wood's invention of the hydraulic hoist immediately opened a great field which had not previously existed for the truck manufacturer,

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a special order, 165 inches. The chassis length over all is 220 inches; from the dash to the rear of the frame, 170 inches; width of frame, 34 inches; width over all, 68 inches; distance from back of seat to rear end of frame, 134 inches. The wheelbase is 58½ inches. The Ruggles two-tonner carries, as standard equipment, oil lights front and rear, tools and kit including jack, wheel puller and hand tire pump, seat and cushions, hand horn.

Choice of Three Bodies.

The Ruggles Motor Truck Co. is prepared to furnish with the two-ton truck a choice of three bodies, express, stake or steel dump. Or it will deliver the chassis alone so that the buyer may fit on to it any special type body he desires. Each truck is equipped with the Ruggles all-weather cab.

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sters, our representatives call, not only on a specified date, but even at a given hour every few weeks, not to peddle, but to offer service.

"Of course, friendships are won slowly," observed J. H. Schaphorst, who handles one of the Rexall trucks out of Fort Wayne. "It takes time for the farmer to satisfy himself that we are genuinely eager to serve him, but once his suspicions are allayed he begins to see that we serve ourselves best by serving him best and hence the benefits of this home service which we extend at some initial expense to ourselves, tend in time to become mutual as sales increase. And they are increasing," the speaker added, as if on second thought.

Each White truck in the Rexall fleet travels approximately 50 miles in a day's rambling over country roads. Bright and early—about 6:30 a. m.—it leaves the garage to "go calling." Late in the afternoon it is back under cover, dusty perhaps, but ready and eager for the next day's jog.

(Continued from Page 3.)

wheels, reducing materially the load per square inch of rubber, so that

LIVES UP TO HER NAME

MISS GLADYS M. WRIGHT, manager of the Inter-City Trucking Service, Jefferson avenue, east and St. Aubin avenue, Detroit, is the only woman in Michigan and is one of the few in the United States, at the head of a trucking business. "I didn't choose the job as a permanent one," she smiled. "It was thrust upon me, temporarily, in the summer of 1918, six weeks after the business was organized, and here I am. I had been working as a stenographer in the sales department of a certain concern. One of the firm started the trucking business as a side line and put me in charge until he could find a man for the place.

"I DIDN'T know a thing about trucks when I started, but now find trucking the most fascinating vocation any girl could have. To me there is something romantic about operating a fleet of trucks. Night and day our trucks are out on the highways between Detroit, Toledo, Lansing, Pontiac and Flint, fighting their way in all sorts of weather, frequently under bad road conditions but, despite obstacles, usually deliver their goods on time.

"When road conditions are bad I leave the office in charge of my assistant and go right out with the men and work with them. In the winter of 1918 we had six trucks snowbound at Holly, Mich. The 'boys' were discouraged and were about to give up. I went out there and stayed. They shovelled and got the trucks out in 24 hours. I'm not very big and if I can stand the cold and hardships the boys think they can. I've worked 36 hours at a stretch. I haven't a driver who wouldn't work on a 36-hour stretch if we were busy."

"Will men take orders from a woman?" Miss Wright was asked.

"I don't give them orders, I work with them," she replied. "Men will do anything you want them to do if you ask them and don't try to boss.

"When we get a new contract I

call the boys into my office and talk it over. I tell them what we are trying to do, make them see that it is their bread and butter as well as ours and in this way get hearty co-operation.

"As a reward for service when we have a special trip, say to Chicago, I select the driver with the best record. There are men in our employ who have been with us two years and haven't lost a package."

When Miss Wright took hold of the business there were just two trucks. By the end of the first year the "fleet" had increased to 10.

"I made service our slogan," she said. "If we had had only one package to send to Flint and if it cost \$25 to deliver it with a return of only \$1, we sent it. In this way I built up the business."

Miss Wright superintends the repairs, having familiarized herself with the mechanical as well as the business end.

"Early in the game I learned, for instance, that driving down hill fast burns out the bearings, and that negligence is the cause of a lot of repair work. When the drivers found I was checking up they didn't come in with their weird tales.

"I see a great future for trucking. For short hauls, limited to 75 miles, I think it will supersede the railroads."

the semi-trailer more nearly conforms with the rulings of road commissioners of the different states, preventing excessive wear and tear on the roads from overloading.

The illustration shows a 20-ton trailer sold to the Detroit Creamery

Co., which works it on a daily schedule, carrying 20 tons of milk from Mt. Clemens to Detroit. This truck and trailer are performing the work, it is claimed, of two trucks at one-half the cost, and is a means of greatly reducing haulage costs.

Built to High Standard

Luedinghaus Espenschied Motor Truck, Assembled from Proven Units Is Said to Be Unusually Well Adapted to Heavy Haulage Service.

BELIEVING that there is a place in the American market for a quality truck at a popular price, the Luedinghaus Espenschied Wagon Co., North Broadway, Howard to Mound streets, St. Louis, Mo., has placed in production four truck models, which offer the buying public probably among the best to be had in standard truck units in an assembled job. The line manufactured includes Model C, a one-ton speed truck; Model W, a 1½-ton speed truck, and Model K, a 2-2½-ton heavy duty job. The units from which these are assembled are made by well-known manufacturers and nothing but the best is allowed to enter the final assembly, it is claimed.

THE engines are of the highest quality and are manufactured by such recognized expert builders as the Herschell-Spillman Motor Co. and the Waukesha Motor Co.

The engine used in the one-ton speed truck, which is designed especially for fast delivery service, is a Herschell-Spillman of 19.6 N. A. C. C. horsepower, but which in actual service develops a considerably greater horsepower. The engine is a four-cylinder, four-cycle, L-head vertical type, and is suspended in the chassis frame at three points, two at the rear and a single trunnion support at the front. The bore is 3½ inches and the stroke five, a combination which develops a smooth, even flow of power at all speeds of the engine.

The engine equipment includes such well-known units as the Schebler carburetor, Atwater Kent ignition and Westinghouse starting and

lighting system. Lubrication is furnished by pressure and splash from an oil reservoir located in the base of the engine.

Cooling is accomplished by means of a special plain tube radiator of Luedinghaus design mounted in the conventional position, a large four-bladed fan driven by flat belt from the pulley on the timing gear set, and a centrifugal water pump, which assures ample water circulation.

The engine used in Model W, the 1½-ton speed truck, is a Waukesha Model BUX, which develops, under the N. A. C. C. rating, 22.5 horsepower and considerably more in actual practise. The bore and stroke are, respectively, 3¾ by 5¼ inches, giving a smooth flow of power at all speeds within the limits of the governor. The engine is a four-cylinder, four-cycle, L-head, vertical type, having a separable head, which is easily removed for inspection or

valve grinding operations. The engine equipment includes a Schebler carburetor fitted with stove and hot air intake to quickly vaporize the gas mixture, Splitdorf high-tension magneto fitted with impulse starter, Waukesha governor, which holds the speed of the truck to a normal speed consistent with good haulage practise.

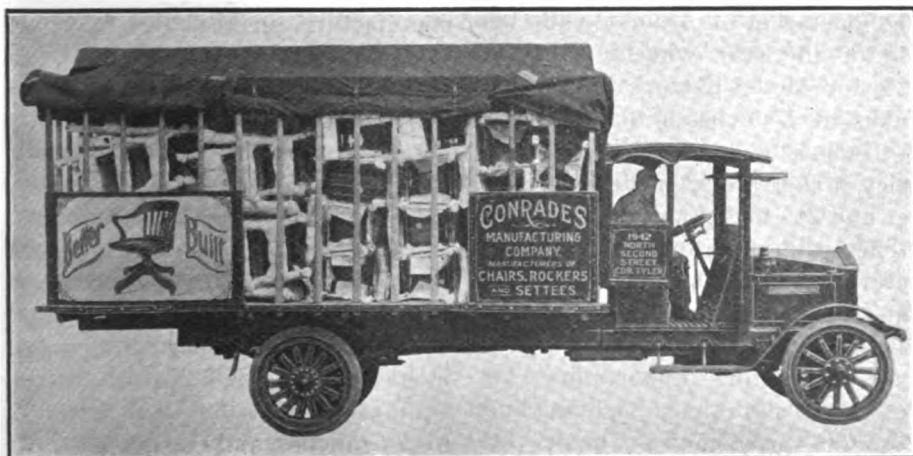
Lubrication is furnished by a pressure pump, located in the sump in the lower engine crank case, taking in the lubricant, through a screen which prevents the passage of sediment, and forcing it through ducts, tubes and the hollow crank shaft to all the bearings of the engine, including the main journals, connecting rod and cam shaft bearings, and the timing gear set, a splash furnishing lubrication to such units as the cylinder walls, pistons and valve mechanism.

Cooling is accomplished by a specially designed Luedinghaus plain tube radiator, located in the conventional position, and a four-bladed fan of heavy construction in the rear, supported by a bracket on the timing gear set of the engine, and driven by a flat belt from a pulley on the timing gear set cover. A centrifugal water pump, which is also power driven, assures ample cooling of the engine at all speeds.

Waukesha Model RU4R.

The engine of the Model K heavy-duty truck is a Waukesha Model RU4R, developing, under the N. A. C. C. rating, 28.9 horsepower and having a bore of 4¼ inches and stroke of 5¾ inches, designed to give ample power for all purposes for which this truck may be used.

The engine is similar to that of the 1½-ton speed truck, but is made heavier for hard, consistent service. The equipment includes a Schebler carburetor with a stove attachment on the exhaust manifold and a Split-



Luedinghaus Trucks Are Assembled of Well-Known Units That Have Stood Up Under the Exacting Tests of Haulage Over All Kinds of Roads.

dorf high-tension magneto, which supplies the engine ignition, while a Waukesha type of governor controls the engine speed to 12 to 15 miles an hour.

Lubrication is furnished by pressure from a pump located in the sump in the engine base, taking oil from the reservoir through a wire screen which prevents the passage of sediment which would clog the ducts and tubes through which it passes to the bearings. After reaching the bearings of the main journals the oil is forced through ducts to the cam shaft bearings and through the hollow crank shaft to the connecting rod bearings. After being thrown off by the centrifugal motion of the bearings, the oil becomes a spray, which splashes to the cylinder walls and valve mechanism, thoroughly lubricating these important units.

Cooling is by means of a specially designed Luedinghaus plain tube radiator placed in the conventional position crosswise of the frame at the front. The large four-blade fan is located behind the radiator and is protected by a shroud which hastens the cooling of the water as it passes through the tubes of the radiator. The fan is driven by a wide, flat belt from a pulley on the timing gear set and provides a constant draft of air.

A centrifugal water pump of generous proportions assures ample circulation of the water through the engine water jackets and radiator, providing sufficient cooling of the engine under all conditions of use.

Second Member of Chassis.

The clutch is a Borg & Beck of the single-plate or three-face type, easily adjusted for wear, and consists of two floating surfaces pressed between the fly wheel and the third or floating member, attached to the clutch driven shaft. In operation the action of the clutch is very smooth and grabbing or jumping of the truck is prevented.

In the Model C one-ton speed truck a Grant-Lee, selective type, three-speed gear set is used, which is in a unit with the engine and bolted to the standard S. A. E. bell

housing of the fly wheel which also encloses the clutch.

In the 1½-ton speed truck and the 2-2½-ton heavy-duty truck, a Detroit selective type three-speed transmission gear set is used which is also in a unit with the power plant, being bolted to the standard S. A. E. bell housing enclosing the fly wheel and clutch.

Spicer universal joints are found at each end of the propeller shaft on all the models, this type of joint being enclosed to prevent the entrance of dust and to eliminate the possibility of the lubricant leaking out. Two joints are used, one at each end of the propeller shaft to transmit the power through the angular drive to the rear axle worm and worm gear.

Wisconsin worm driven axles are employed in all three models. It is of the semi-floating type, enclosed in a semi-steel housing of large size which provides a wide margin of safety for the capacity of the truck. The worm and worm gear are made of wear-resisting steel and bronze which require little attention aside from lubrication. Ample bearing surface is provided by means of single and double annular ball bearings which take the thrust and weight of the units of the axle. Special alloy steel driving shafts of large size are used in all models, with an S. A. E. standard splined at the differential end and are fitted with a keyway and threaded end to take a nut on the wheel hub end.

Braking Systems.

Two braking systems are used in all models of the internal expanding type, operating on drums on the inside of the rear wheels. On the 2-2½-ton Model K truck the service brakes are 17 inches in diameter and 2½ inches wide, while the emergency brakes are 12 inches in diameter and 2½ inches wide.

The springs are of Tuthill manufacture, made of chrome silica manganese, electric furnace alloy steel, shackled at both ends. Every point presenting opportunity for wear has a bronze bushing and thorough provision is made for lubrication.

In the smaller Model C truck the

Hotchkiss drive is in use, while the 1½ and 2-2½-ton Models W and K use torsion rods fastened to the axle housing at one end and to the under side of the forward spring shackle housing at the front. Spring action is provided for by means of a hinged joint just back of the hanger, while lubrication is secured by an oil kip and wicking at the forward end.

The frame of Model C is of channel steel, heat treated; of Model W, pressed steel, 5½ inches deep and of quarter-inch stock; the frame of Model K is pressed steel, 6 1/16 inches deep, having a three-inch flange and is of ¼-inch stock. The corners are heavily reinforced with steel plates, hot rivetted to prevent loosening, and several cross members, also hot rivetted to the side members, provide against strains and stresses affecting the alignment of the frame and chassis.

The front axle on all three models is of the same general construction; that is, a drop-forged I-beam acts as the load-carrying member, having yoke ends cast integral, while the steering and wheel spindles are fitted with Timken roller bearings.

The steering gear is a Lavine, adjustable worm and nut type, an 18-inch wheel being used on Model C and 20-inch on Models W and K. The steering linkage and tie rod are of unusual strength, constructed in such a manner as to withstand the twisting and torsional strains of driving over all kinds of roads.

The wheels are of wood, artillery type, on Models C and W, of St. Mary's manufacture; they are also of wood, artillery type, of Bimel manufacture, on Model K.

The Model C truck is equipped with 35 by five-inch pneumatic cord tires front and rear, truck type, as regular equipment, while the Model W 1½-ton has solids or pneumatics optional. The regular equipment consists of front, 34 by 3½-inch tires, and rear, 34 by five-inch single solids, or pneumatics, front 35 by five-inch, and rear, 36 by six-inch. The model K 2-2½-ton truck is equipped with solid tires front, 36 by four inches, and rear, 36 by seven inches, or pneumatic cord truck type tires at extra cost.

(Continued from Page 5.)

vehicles.

In the three types of engine cylinders mentioned the cylinder heads in the early designs were not removable; later, however, this feature has been changed and L, T and I-head cylinders fitted with removable heads are found. This feature proves of inestimable value when disassembling for removing carbon, grinding valves and other repair work in connection with the cylinder unit of the power plant.

The fourth type, known as the H-head, because the valves are located at the sides of the cylinders, operate inwardly toward the center of the combustion chamber. This cylinder design is found in the Duesenberg engine, later called the Rochester, and is used in several well-known cars. The engine is noted for its high power and speed and when used in racing cars, for which it was originally designed, helped considerably in developing automobile racing in America.

The Knight type of engine is the fifth design among the popular makes and is of the H-head construction, depending, however, on sleeves provided with valve openings near the top, which cut off and open passages for the admission and expulsion of the gases to the combustion chamber.

Cylinder Troubles.

There are three principle troubles which may develop in the engine cylinders: First, cracks in the walls of the cylinder which admit water from the water jacket when the compression is low or the engine is not operating, and when the engine is operating, allowing the compression to force the unburned oil through the crack into the water jacket. The trouble may be serious, depending on the size of the crack and the amount of water entering the cylinder. If the water is allowed to collect for a period it will seriously affect the starting of the engine and will also cause rust to form on the bright metal surfaces of the piston, rings and cylinder wall, forcing unburned oil into the water jackets, where it mixes with the water of the cooling system, is not

particularly harmful, but if allowed to continue for any length of time an oily scum may form in the radiator sections, which will eventually cause water restriction and overheating of the engine.

Cracks in the cylinder walls caused by freezing should be remedied at once by either filling the cooling system with a strong solution of sal-ammoniac and water, allowing the sal-ammoniac solution to seal the crack with rust, or by removing the cylinder or block, either replacing with a new block or having the crack repaired by welding or plating with one of the patented plating methods in use.

Cylinder Scoring.

The second trouble that may occur in the engine cylinder is scoring. This is often caused by a wrist pin becoming loose in its fastenings, working to one side and cutting the cylinder wall with the pin end, as the piston travels up and down in the cylinder. Scoring may also be due to a broken ring, scratching the cylinder wall with the travel of the piston; or by foreign material which has become lodged between the cylinder wall and the piston, aggravated by the travel of the piston. Scores are usually indicated by a long scratch or groove extending the full length of the piston travel, their depth depending upon the length of time that this condition has been allowed to continue and results in the loss of compression, with the consequent loss of engine power.

Two methods are open for curing this trouble when it exists. The cylinders are removed from the engine base or crank case and the scores are filled in either by a patented plating process or by reboring the scored cylinder, removing sufficient metal to get below the bottom of the scores. Reboring necessitates refitting oversize pistons and rings when the pistons are assembled and often increases the original power of the engine.

After the scores are filled by the plating process the excess metal is removed by regrinding and the original pistons are fitted with the original rings.

The third trouble encountered is

when the cylinder wall has been worn out of round, causing loss of compression, lack of power and piston slap. This condition is brought about, usually by foreign matter, such as dust containing grit, entering the lubricating oil in the base, and splashed by the connecting rod tips to the walls of the cylinders; it is then carried by the pistons in their travel and carried higher up on the cylinder walls. The travel of the piston and rings with the gritty oil causes abrasive action, which soon wears the walls out of round. The piston and rings do not fit evenly, with the result that a piston slap is heard in the affected cylinders, and lack of power is noted in the engine, which is due to the compressed gas working by the pistons.

Cylinders which are out of round may be restored by reboring and refitting oversize pistons and rings. The cause of the dust entering should be located and a remedy applied which will prevent further abrasive action. A source for the entrance of dust is often at the breather pipe, which on some engines is located on the front right-hand corner of the crank case, just at the rear of the radiator and fan. Road dust passes through the core of the radiator, is caught by the revolving fan and is forced with considerable pressure across the top of the breather, some of the dust settling around the breather openings and other portions entering the breather pipe, coming to rest finally in the oil in the crank case under the number one connecting rod, which later picks up the oil and distributes it on to the cylinder wall as described. The use of a very fine screen or additional baffle plates at this point will naturally help to prevent trouble from dust.

Compression.

Engine cylinder compression may be divided into two classes, too heavy and too light. In the early days of motoring troubles in connection with faulty compression were very common, as designers did not possess sufficient knowledge from which they could make an engine for certain lines of work that would have the correct number of

pounds of compression. Today this information is available and automotive engineers have no difficulty in designing engines for varying lines of service. Racing cars require a very high compression, usually around 90 to 100 pounds to the square inch, while passenger cars do not require a compression as high, from the nature of their work, this usually being between 60 and 70 pounds to the square inch. Engines designed for motor truck and tractor service, known as heavy-duty engines, are called upon to develop full power for long periods and, if the compression is too high, overheating and knocking will result. Engines of this type are of low compression, usually about 50 pounds to the square inch, with the engine speed governed to 800 to 900 revolutions a minute for tractor service and from 1000 to 1200 revolutions for truck service.

A trouble which may occur in some engines is too high a compression, which causes a distinct knock and might almost be thought to be caused by carbon deposits. Upon removing the cylinder head, if it is found that carbon is not present, the fault may often be remedied by raising the cylinder block about one-eighth to one-quarter of an inch, fitting a gasket made of fiber between the crank case and cylinder block and enlarging the combustion chamber the thickness of the gasket.

Engine cylinders as designed by automotive engineers today are usually correct in proportions and sufficient compression pressure is determined by the type of work the engine is supposed to perform. Weak compression, therefore, is not a condition caused by faulty design, but by compression leaks of the combustion chamber. To remedy the leaks, first discover the cause. This may be leaky valves, plugs or caps, scores in the cylinder walls or pistons, or rings improperly fitted. After finding the source, which may be determined by eliminating one item at a time, the repairer should then take the proper steps to remove the cause.

Testing Engine Cylinders.

Testing automotive engine cylin-

ders for troubles caused by lack of compression is easily accomplished by turning the engine with the hand crank, noting as the piston comes up on compression if there seem to be leaks which allow the piston to be turned by upper dead center without offering resistance. Leaks around the spark plugs, valve plugs or head gaskets are denoted by a hissing sound, which may be distinctly heard by the tester. Squirting oil around the threads of the plugs or along the edge of the head gasket will quickly indicate, by bubbles forming, the leak when the piston is again brought up on compression.

Leaking valves are somewhat harder to locate and are usually left until the last in testing operations. Leaks by the piston from scores in the walls of the cylinders or ill-fitting pistons and rings, are indicated by a slight hissing sound barely discernible to the tester unless he is using a form of testing instrument which much resembles a telephone receiver fitted with an extended rod or some form of patented tester. Piston ring leaks may be detected by inserting the tester in the spark plug openings. What actually happens in piston ring leaks or scores is that the pressure of the gas mixture is forced by the rings or valves, giving off a hissing sound. Perhaps a better method of locating this trouble is by the quantity of carbon deposited on the spark plug points and the amount of oil present in the combustion chamber. One trouble usually follows the other for, if the rings are fitted correctly to the cylinder wall, oil from the engine base cannot readily work past only in sufficient quantities to lubricate the wall and rings. However, if the plugs and gasket are free from leaks, as shown by the oil test, and the compression is still weak, the repairer should disassemble the cylinders, either by removing the cast head or the block from the engine crank case. Further inspection of the cylinder walls with the head or block removed from the crank case will show the condition. If scores are not found in the cylinder walls, probably the last item to cause

trouble will be the engine valves and regrinding will restore them.

Piston rings which do not fit the walls evenly with a small open space between the ends of each ring, should be removed and replaced with rings that are properly fitted.

Rings which show black spots on the surface adjoining the cylinder wall should be replaced, as this indicates that gas is shooting by, and that the rings do not fit the wall evenly.

Pistons which show black spaces on the skirt also indicate that gas is shooting by and that the piston is too small for the cylinder bore. Replacing the piston with another slightly oversize usually remedies the trouble.

Testing a cylinder which is out of round should be done by a mechanic as the test requires the use of special tools which show to the thousandth part of an inch the wear of the wall surface and follow the full length of piston travel.

Once determined by the mechanic out of round cylinders are repaired by reboring or regrinding, followed by fitting oversize pistons and rings.

When reassembling the piston, rings, valves, removable head, etc., to the engine cylinder block, the newly fitted parts should be lubricated as they are assembled. This prevents overheating of the parts and causes them to work smoothly as soon as the engine is started. Allow the engine to run till warmed thoroughly, then test the engine compression again, noting if leaks are still present. Tightening the head stud bolt nuts may remove some of the leaks, while tightening the plugs will remove others. Reground valves will not as a rule obviate leakage under 50 or 100 miles of road travel, by that time finding their seats so that leakage is prevented. Leakage by the piston rings takes about the same length of time unless time is taken to lap the rings to the cylinder wall. An over-supply of lubricating oil should be used in the engine oil reservoir while these rings are seating themselves and the oil should be drained at the end of about 250 miles of travel, and replaced with fresh oil.

Stewart Shows New Model

Economy of Operation Is Claimed by Manufacturer of New Three-Quarter Tonner Which Is Constructed Throughout of Truck Units.

STEWART MOTOR CORPORATION, Buffalo, N. Y., announces a new $\frac{3}{4}$ -ton speed truck in which are featured genuine rear truck axles, truck type radiators and truck type wheels with cord tires all around. It is claimed to combine power with economy of operation, showing an average of 14 to 16 miles per gallon of fuel and a speed of 45 miles an hour with a capacity load. In designing the covered and open express bodies, the seat has been made separate from the top, thus enabling the owner to readily convert a covered express into an open express body with the addition of a cab, which will interchange on the seat of either the open or covered express. The Stewart $\frac{3}{4}$ -ton speed truck is distinguished particularly by its power plant. The engine used is the new Buda Model MU motor. This motor has been designed especially for speed truck work, and has a bore and stroke of $3\frac{5}{8}$ by $5\frac{1}{8}$ inches. The cylinder head is removable, as is also the cylinder block, making the engine one of the most accessible on the market. This engine is rated at 21.03 S. A. E. horsepower.

IT HAS the Remy system of ignition. Carburetion is accomplished by the new model Zenith carburetor, which is adjustable with a hot spot quick-starting device. The gasoline is fed to the carburetor by gravity from a 16-gallon round type tank which is made of terne coated steel to prevent rusting and corroding, supported on malleable iron brackets under the seat.

The engine lubrication is through a full force pressure feed system to the crank shaft, cam shaft bearings and connecting rod bearings. The chassis lubrication is effectively secured through the Alemite system. The water is circulated by a centrifugal pump having a large bronze runner. The radiator is of the cast-iron armored type with vertical tubes, and has a capacity of five gallons.

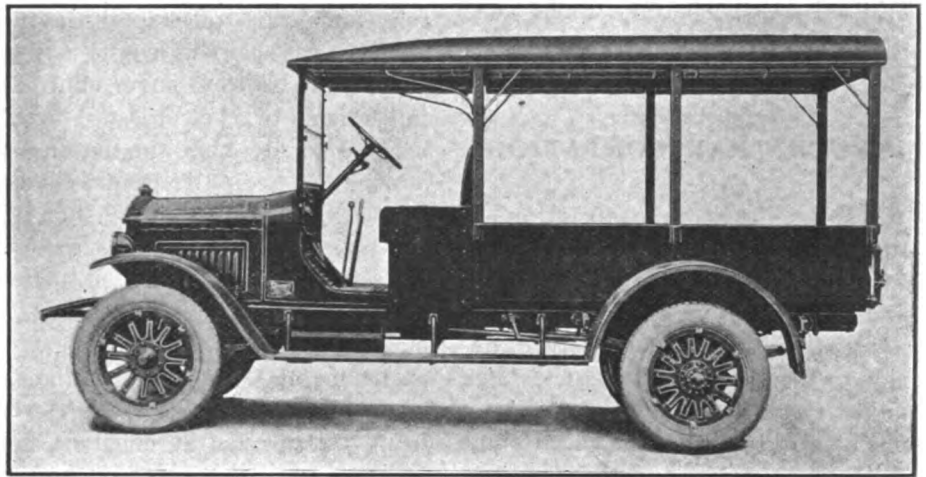
The clutch is of the dry-plate, single-disc type, with one set of steel plates, and another set of steel discs lined with moulded clutch facings.

The engine, clutch and transmission are mounted as one unit, on three-point suspension. The shafts of the transmission are mounted on annular ball bearings.

The transmission gear shifter fingers are made of .20 carbon steel, and are case hardened to prevent wear.

Equipped with High Gear Ratio.

The rear axle is a Clark internal gear drive, the same as has been used so successfully on other Stew-



Genuine Rear Truck Axles, Wheels and Radiator Make This Light Stewart a Real Truck—It Should Stand Well the Strain of Speedy Delivery.

art models for the past several years. It is geared 5.53 to one so the total reductions from engine to rear wheels are as follows:

High, 5.53 to one; intermediate, 10.27 to one; low, 17.08 to one; reverse, 21.40 to one.

The front axle is of the drop-forged type, $1\frac{3}{4}$ inches wide by $2\frac{3}{8}$ inches deep, made from the best grade of carbon steel obtainable and is especially heat treated.

The steering knuckles, which are exceptionally strong and large, are forged from nickel steel and heat treated. The ball on the steering arms is $1\frac{1}{8}$ inches in diameter, and is hardened and ground to size. The axle spindles are $1\frac{5}{8}$ inches in diameter, nickel steel, hardened and ground to size, the dimensions being held to very close limits. They are large for the loads they have to car-

ry. The steering gear is of the screw and nut type with an adjustment on the thrust bearings for removing any end motion of the screw that may develop.

The frame side rails are $4\frac{1}{2}$ inches deep and $2\frac{1}{4}$ inches wide, and the thickness of the steel used is $\frac{3}{16}$ of an inch. There are three cross members, two of which are not rivetted solidly in place.

The front springs are the semi-elliptic type, 41 inches by two inches wide, equipped with full-length rebound plate. The entire spring is made of special grade silico manganese alloy steel, heat treated for flexibility and long life, equipped with bronze bushings working on hardened steel pins, equipped with the Alemite high-pressure lubricating system.

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The rear spring is of the semi-elliptic type, 54 inches by two inches wide, equipped with full-length rebound plate. The entire spring is made of special grade silico manganese alloy steel, heat treated for flexibility and long life. The rear springs also have bronze bushings and the Alemite greasing system.

The wheels are artillery type, 12 spokes in front and 14 in the rear. The spokes are square.

The truck is equipped with 32 by 4½-inch cord tires all around. The regular equipment consists of electric head lights, with legal lenses, equipped with dimming devices, electric tail lamp, tool box, 111-hour Willard storage battery, tools, jack, horn, oil gauge and armature. The chassis is painted Napier green.

TRUCK TRANSPORTATION.

"Motor Truck Transportation" is the title of a book just off the press which is written from the economic and application standpoint and does not deal with the manufacture, design or mechanics of the truck. The motor truck is accepted as a proven mechanical device and an attempt is made to bring out those principles which govern its most efficient use and most successful application. The text is prepared in such a manner as to be easily understood and the reader is given a good conception of this comparatively new method of transportation.

"Motor Truck Transportation" is written by F. Van Z. Lane, C. E., and is published by the D. Van Nostrand Co., 8 Warren street, New York City.

Trucks Oust "Water Wagons"

Motorized Flushing Outfits, by Reason of Greater Utility and Efficiency Relegate Horse-Drawn Sprinkler Carts to Limbo of Forgotten Makeshifts

THE flushing method of cleaning the streets of large cities is apparently gaining in popular favor according to the reports of manufacturers of this type of power vehicle. While the method is not new, vast improvements have been made in the design of the machines used for this purpose. Formerly the work was done with horse-drawn vehicles and air pressure supplied by power taken from a large sprocket on one of the wheels, the power taken in this manner through chains and sprockets driving an air pressure pump which caused a varying pressure on the water inside the tank.

THE pressure would start at 75 or 80 pounds with the tank full, and drop off rapidly as the vehicle was hauled over the road. It was only able to cover short distances before the pressure would become so low that the action was more like a sprinkler than a flusher, the slow motion of the flusher failing to keep the air at the required pressure for flushing.

New machines are now in use in many large cities, which have a capacity of 1000 or more gallons of water while the water is forced from the nozzles at constant high pressure until the water in the tank is exhausted.

The tank and pressure pumping machinery is mounted on a motor truck chassis, a separate engine being used for operating the pressure pump. The statement is made that this type of flushing machine is able to cover large areas in a day's time and especially so when two crews are used operating day and night with the exception of Sundays.

The city of Altoona, Pa., a short

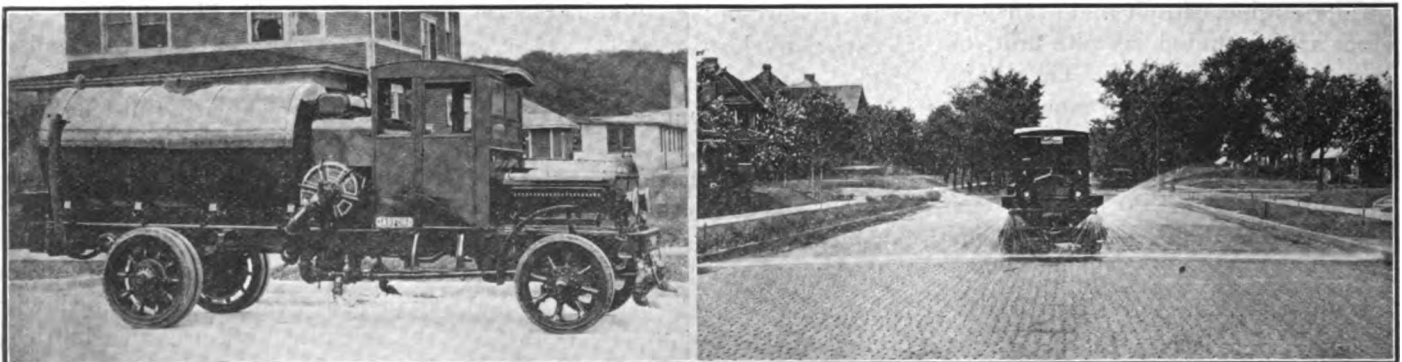
time ago purchased a Garford 3½-ton chassis equipped with a 1000-gallon tank pressure pump, engine, filling hose and flushing heads, and reports very favorably on its operation.

To prove that the flusher would do the work claimed, the streets were left in an uncleaned condition for two weeks previous and were in a very dirty condition. The flusher amply demonstrated that it could clean streets in this condition without difficulty, and it was further found that it could clean five miles of streets in each shift of 10 hours, using day and night shifts.

The cost of operation, it has been ascertained, will be approximately \$7 a mile, including two operators, two men following behind, interest on the investment, depreciation, gasoline and oil, but not including the cost of water.

Two old type of flushers owned by the city, of an obsolete type purchased some nine years ago, were never a success. It required 25 min-

(Continued on Page 52.)



One Would Find It Quite a Task to Enumerate the Various Uses to Which Modern Science Has Adapted the Motor Truck. This Efficient Street Sprinkler Is Taking the Place of Several Horses for the City of Altoona, Pa.

Possesses Unusual Features

Bryan 15-30 Light Steam Tractor Burning Kerosene or Distillate Uses Patented Steam Generator Which Is Said to Prove Efficient.

AMONG the new tractors for the 1922 season which will be exhibited for the first time at the National Tractor and Farm Power show held in Minneapolis in February, will be the Bryan light steam tractor manufactured by the Bryan Harvester Co., Inc., Peru, Ind.

In departing from the conventional gasoline-kerosene automotive type tractors, the Bryan Harvester Co. has entered a field for the first time with a light-weight popular size tractor propelled by steam which is generated by a burner using either kerosene or distillate. The great drawback in the past has been the necessity of frequent water supply for the generator or boiler in steam-driven tractors, but the manufacturer of the Bryan light steam tractor claims that the 30-gallon water tank, in conjunction with the condensing system, will give sufficient water supply for from five to 10 hours' service, depending on the conditions encountered.

IN APPEARANCE the 15-30 Bryan light steam tractor much resembles the conventional gasoline-kerosene automotive type. The condenser is located in the conventional position for the radiator, with the steam generator and burner at the rear of the condenser under the hood and the twin-cylinder Bryan steam engine is at the rear delivering power from the engine crank shaft direct through the Allen self-locking type differential to the axle shafts and drive wheels.

Steam Generator.

The Bryan patented steam generator is a water tube type and is not, it is stated, in any sense a flash or semi-flash generator. A water level of about two-thirds of the generator capacity is maintained at all times. The generator is constructed in sections so that any part may be replaced without interfering with other parts or the use of the tractor. Damaged tubes may be removed and new tubes replaced without disturbing others by simply removing the generator casing and releasing two connections. In case a new tube is not available plugs may be inserted in the generator connections and the tractor can resume work.

The firing system used in conjunction

with the Bryan steam generator is of the vaporizing type. A positive steam automatic gauge controls the fire, shutting off the fuel when a pressure of 600 pounds is obtained and starting it again when the pressure falls below that point.

Water is supplied to the generator by plunger type pumps, while the water from the condenser is returned to the generator to be used over and over again, making possible five to 10 hours work with a single 30-gallon tank of water.

Specifications.

Horsepower Rating—15-30.
 Engine—Two-Cylinder, Piston Valve; Four-Inch Bore, Five-Inch Stroke.
 Valve Gear—Stephenson Link.
 Steam Generator—Bryan Water Tube. Working pressure, 600 pounds; tested pressure, 1200 pounds, hydrostatic test.
 Burner—Vaporizing Type. Burns kerosene or distillate.
 Lubrication—Cylinder by forced feed with high test oil. Rear axle and engine as unit in oil.
 Pumps—Plunger type driven from Jack shaft.
 Water Level Indicator—Bryan.
 Condenser—G. & O. Tubular.
 Front Axle—Forged, auto type; Timken Roller Bearings.
 Rear Axle—Bryan Direct Drive. Hyatt Roller Bearings on drive, intermediate and jack shaft; ball bearings on differential.
 Gears—Engine, Jack Shaft and Differen-

tial Ring Gear are steel, heat-treated, spur type.

Differential—Allen Self-Locking.

Brakes—Contracting band, Raybestos lining.

Steering Gear—Wohlrab, worm and nut.

Wheels—Special diagonal brace.

Front Wheels—Diameter, 32 inches; Face, five inches.

Drive Wheels—Diameter, 52 inches; Face, 12 inches.

Wheelbase—38 inches.

Tread—60 inches.

Frame—Riveted Sectional Channel.

Fuel Tank Capacity—30 Gallons.

Water Tank Capacity—60 Gallons.

Instrument Board—Steam Gauge, Air Gauge, Lubrication Oil Sight Feed.

Belt Pulley—Diameter, 18 inches; Face, 6 1/2 inches; removable.

Belt Speed—3000 Feet Per Minute.

Belt Drive Bearings—Hyatt Roller Bearings with gear thrust taken by ball thrust bearings.

Governor—Fly ball type.

Fan Drive—Through spiral gears mounted with ball bearings.

Wheel Cleats—Angle iron.

Weight—5500 pounds.

Ground Clearance—15 inches.

Turning Radius—14 feet.

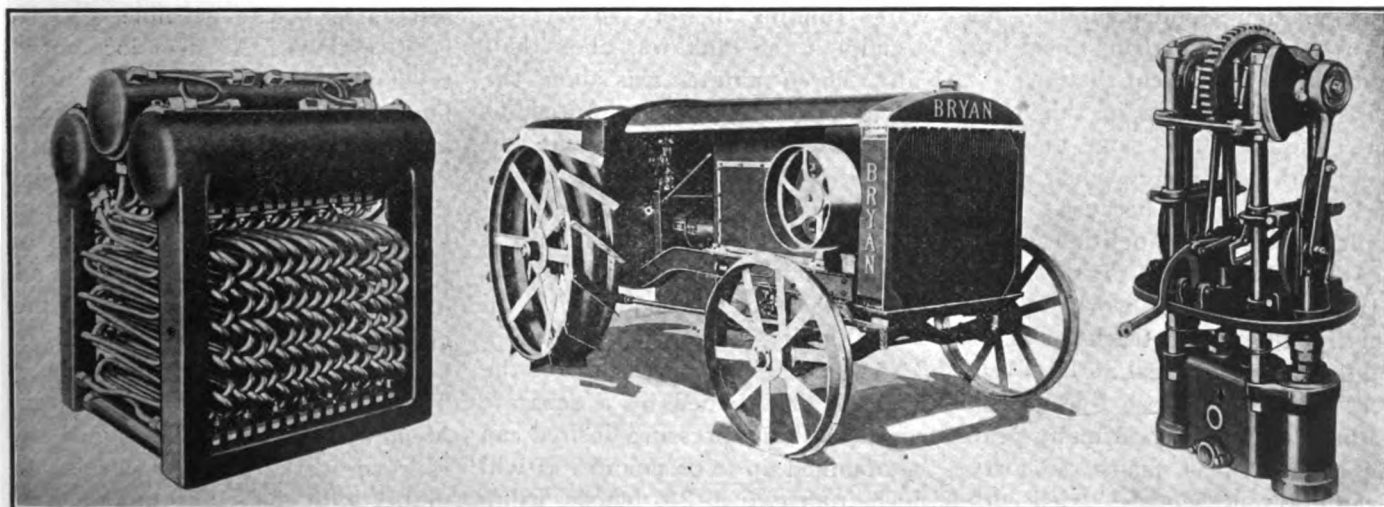
Draw Bar—Adjustable.

Tractor Speed—Creeping to five miles per hour.

Work on Tank of Water—From five to 10 hours depending on conditions.

Shafts—Heat treated.

No. of Plows Recommended—Three to 14 inch.



Left, Bryan Steam Generator Supplies Pressure of 600 Pounds. Center, Bryan Steam Tractor, Designed for Consistent Service, Embodies Many Special Patented Features. Right, Final Drive Through Spur Gears from Twin-Cylinder Steam Engine to the Differential and the Wheels. Firing System Is of the Vaporizing Type. An Automatic Gauge Controls the Fire.



"THE double-blanked? ! ! ! !—
blanked horny headed idiot
that wrote that so-called editorial
has about as much knowledge of
selling used trucks as a camel has of
bobbing a fat woman's hair," snarled
O. M. Vett as he slammed a gaudily
covered magazine across the room,
narrowly missing the placid scrub
woman who was starting in to clean
the office at the end of a busy day.

"I hate like sin to lose this temper of mine—always makes me feel like a darn fool, but why in time, if these fellows are bound and determined to write articles—don't they find out something about their subject?" he grumbled.

"What's the trouble?" I asked. Mad—or just excited?"

"Neither," answered Vett sourly, "but here's a fellow," retrieving the tattered magazine, and thumbing the pages, "here's a fellow that goes on for two solid pages about how to deal with the used truck problem and I'm willing to bet you anything you like that he never so much as rode on one in his life. I can tell that easy enough by the way the thing reads. His ideas might be good enough fundamentally, but when it comes to putting them into practise it's a different matter.

"If all the dealers in this town were one and the same man, his ideas, with certain revisions, would work out fine because there wouldn't be any competition, but as it is they're worthless. It's a matter that each man must work out for himself, this used truck business, and there isn't any real SOLUTION to it. I know because I've been in the business for a good many years and have seen as many as forty-seven different 'schemes' tried without any particularly good results.

"Second-hand trucks are in the

class with anything else that has been used for a certain length of time by the original purchaser, and it's simply a case of getting rid of them in the best way possible. The successful trader is going to be the winner in that end of the business. We've never had any trouble to speak of along that line and there **ISN'T ANY PROBLEM** so far as we're concerned. We take used trucks for what they're worth—don't allow too much for them in trade, and figure to spend enough on them to make them a good buy.

"So far we haven't lost anything; as a matter of fact we've made a little something on them if the truth was known, and that's good enough for anybody. Our experience, I'll venture to say, is similar to that of any true business man in the industry—and the man who doesn't understand the principles of real selling, which is exactly the head that trading-in trucks comes under, had better get into a business that requires no salesmanship."

I nodded. "Yes" I agreed. "You're right. Well, there's a lot of good openings in the undertaking business since prohibition. Some of the kickers would fit good in that line—short hours, a fair return on your money—"

"—and no selling effort because the people would be just dying to trade with them!" interrupted Vett.

(Continued from Page 50.)

utes to fill the tank, as the air pressure in the tank resulted in the water running in very slowly, especially if the tank was about half full. Three minutes was about the usual length of time required to empty the tank and only about half a block could be flushed at a filling. As the water went down, the pressure became less until finally it failed to flush.

The new machine equipped with a 1000-gallon tank can be filled in 2½ minutes. The pressure on the water is maintained by a separate engine and any pressure desired can be obtained up to 65 pounds. It will flush from two to 2½ blocks, using three nozzles and four blocks using two nozzles.

Trackless Trolleys

TRACKLESS trolleys of the most approved type are being experimented with on Staten Island, which is a part of New York City. The new cars possess greater stability than has been attained before with this type of traction. They are equipped with greater motive power and with all the safety appliances developed by experience in high-speed traction. The electric power is supplied by two overhead grooved trolley wires. One wire is positive and delivers the current to the cars, while the other is negative, receiving the current passing through the motor and completing the circuit.

(Continued from Page 18.)

all expenses up to date for crew, gasoline, oil and maintenance. The earning capacity in this particular case has been well over \$30 a day. The results have been so satisfactory that the railroad operating this car is voluntarily doubling the passenger service to its patrons, which is, indeed, a unique situation for a short-line railroad.

The coach work consists of a bus type body, the interior view of which is shown. Entrances are provided on both sides near the front end, and are controlled by the motorman from his position. The seats are rattan covered, with spring bottoms. Lighting is by electric generator and storage battery, the lights being adequate for reading. The car is equipped with an electric self-starter. The gasoline capacity is 40 gallons. A steel locomotive type pilot is provided. The front fenders are also built over the front truck. Two sets of brakes are provided, one operated by a foot pedal, the other by a hand lever acting on the rear wheel drums. Brakes on the front truck can be had at an additional cost. Hand-operated mechanical sanders are supplied on both sides of the driving wheels.

The rear wheels are of a special Mead cushion type, developed for railroad work. These wheels, together with the swing motion front truck and other cushioning features, make the car easy riding.

(Continued from Page 2)

month. The 2½-ton trucks cost on an average \$137.30 a month for the same items and the 3½-ton trucks, including an extra helper, \$355 a month. Adding the averages for each truck the total of \$2148 is obtained as the average total expense for operating the fleet for one month; multiply this figure by 12 for the months of the year and the total expense for the year of \$25,776 is gained. To give an idea how this average will vary, the month of September was a particularly busy month for the company. The gross expense for the 12 trucks for this special month was \$5016.72.

The tire equipment in use at the present time consists principally of Goodyear DeLuxe single solids front and rear. The company is also testing out the so-called caterpillar type tire on one or more of the trucks, which is claimed to possess many features not found in the conventional type of solid tire.

Delivery Rates Very Moderate.

Store delivery rates are charged as follows, which place the goods inside the customer's door: Fifty cents for a minimum delivery up to 1000 pounds; all over 1000 pounds, five cents a pound, or \$1 a ton. It is stated that other large competitors are charging the same schedule of rates, while those of smaller concerns are lower. A two-ton truck returns \$2 an hour, including the driver; 2½-ton trucks, \$2.50 an hour with driver, and 3½-ton trucks \$4.50 an hour, including driver and helper. For all average haulage service the two and 2½-ton trucks are ample, while the 3½-tonners are used mostly for unloading freight cars, as their operation is quicker and cheaper for the customer.

While the writer was gathering the data in connection with the motor truck operations of the Central Public Warehouse Co., attention was called to a two-ton truck purchased Jan. 1, 1915, which was hauling a load of 50 Linde oxygen containers for the Linde Air Products Co., New York. Three and one-quarter tons was considered a load for this two-ton truck, which consisted of 50 tanks weighing about

OLD TRAFFIC RULE BARS MOTOR TRUCK

A COPY of the 1904 traffic ordinance of San Diego was recently unearthed from the archives of the Automobile Club of Southern California. "It shall be unlawful for any person to ride, drive or propel any bicycle, tricycles, velocipedes or other riding machine or horseless freight vehicle at a rate of speed greater than four miles an hour over or past or across any street intersection. "Velocipede riders shall not plunge through the business section at a rate of speed greater than 12 miles an hour anywhere."

Trucks were included in this category in 1904.

151 pounds each. The truck made five trips a day, hauling a total of 37,750 pounds a day, working five days a week and Saturday forenoon. During this period, with three extra trips Saturday morning, this truck hauled a total of 1400 Linde steel oxygen containers, weighing 161,400 pounds, or 80.7 tons.

The wisdom of using trucks of one make tends to prevent confusion in the repair and parts department, enabling the repairer in charge to become expert in the repair of this particular make of truck and also simplifies the handling of the trucks for the drivers, as they are thus able to change from one truck to another without confusion. The repairer thus is able to keep the trucks of the fleet in a high state of repair with the least amount of lost time. Interchangeability of parts is a feature which should not be overlooked as parts can easily be borrowed, in the case of an emergency, from a spare truck, replacing them later when new parts are received from the factory or dealer, in this way preventing loss of time.

Supplies used by the trucks of the fleet may be purchased at wholesale, as the company, by maintaining a fleet service station, is placed in a position where it can avail itself of

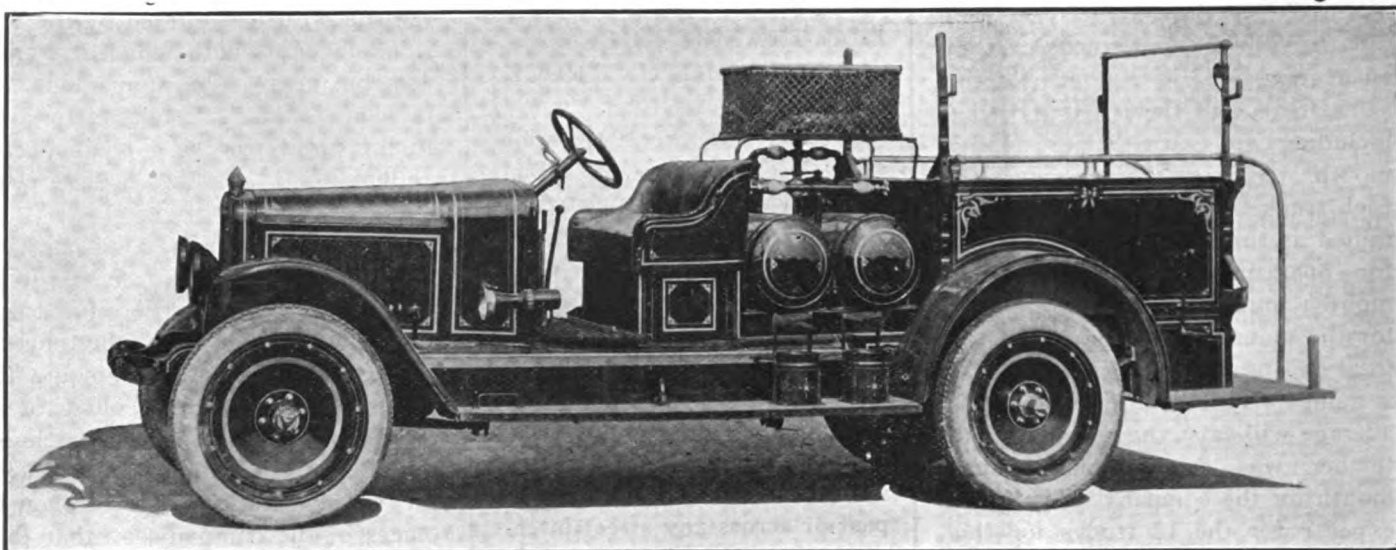
the special prices offered by the various concerns with which it transacts business. This item alone, in the course of a year, adds materially to the profits of the company, enabling it to operate its fleet economically.

In a large concern, such as the Central Public Warehouse Co., it is necessary to watch closely for leaks which, although small at the time, if allowed to continue will amount to large sums during the course of a month or year. A close watch is thus kept of operation costs both at the service station and warehouse offices of the company, so that the company is able to know with a degree of certainty how much it costs to operate a two, 2½ or 3½-ton truck, and whether that particular capacity truck is making or losing money. Each truck is listed separately and all labor charges and supplies are charged against each separate truck, together with the wages of the driver. The amount of work performed by the truck is credited on the other side, and from this record the company bookkeeper is able, within a few minutes time, to give the standing of any particular truck. The firm's choice of Standard trucks, manufactured by the Standard Motor Truck Co., Detroit, seems to have been well founded, as they have performed in a creditable manner and the firm has added additional trucks of the same make as the business increased.

When asked by the writer if they would return to horse drawn vehicles to carry on their haulage service, the general manager replied that horse-drawn vehicles were out of the question, as they were too slow for the work and nothing but trucks would admit the hauling of the large volume of merchandise handled daily by the company with any degree of profit.

Expansion Necessary in the Spring.

The six warehouses which are used at present contain a total of 136,000 square feet of floor space. This warehouse space proved sufficient for a time, but the rapid growth of the business forced the owners to seek additional storage space, which they have done.



Nearly Every Small Town Has Its Motorized Fire Apparatus Which Is Mounted Usually on the Light Truck Chassis—It Is Invaluable in the Event of Serious Conflagration, Having Won the Highest Approval from Users.

Announce New "Red Pyramid"

Service Motor Truck Co. Now in Production on
Model Specially Designed for
Light Delivery.

REMARKABLE progress has been made during the last few years in the science of transportation engineering. With it there has grown up, on the part of truck buyers, a better understanding of the fundamentals of a successful transportation system. Truck buyers, more and more, are purchasing units of the correct capacity for the work to be done. This has had a far-reaching influence on the motor truck industry. It has shown the absolute need for a really well-built, powerful speed truck—a truck that combines at once the dependability and reliability attained by the better known makers of heavy-duty trucks, and the speed and quick manoeuvring ability of the make-shift light truck.

The Red Pyramid Speed truck just announced by the Service Motor Truck Co., Wabash, Ind., it is claimed, is the product of four years' development and test. Work on this truck was first begun by the engineers early in 1917, but was temporarily suspended owing to the pressure of war work, the building of

trucks for the United States government. During the interval, however, the experimental jobs were used around the factory as utility trucks, often making emergency trips to Detroit, Chicago and Cleveland.

In this truck the principles of service scientific cushioning are highly developed and the mechanism of the truck is carefully protected from each of the five fundamental shocks, strains and stresses to which all motor trucks are subject: (1) load stresses, (2) road strains, (3) road shocks, (4) driving strains and shocks, (5) braking strains and shocks.

The conventional semi-elliptic rear springs are used, with the exception that three heavy rebound leaves are added. At the front end, however, a semi-elliptic spring is mounted crosswise, ends being carried on the axle and the center supporting the frame. This spring is pivoted at its central point so that the front axle is perfectly free to move about this pivot.

A number of very beneficial re-

sults are stated to be obtained with this arrangement. The entire truck, with this suspension, is carried on a three-point support so that all strains and twisting of the body, hood, radiator, seat and steering mechanism are also removed from the frame. Since with this construction the spring suspension provides perfect flexibility, it is possible to make the frame relatively stiff, which is of considerable advantage in preventing the racking of high-grade equipment such as panel delivery bodies.

A further quite remarkable improvement is made in the riding qualities. With the front spring arrangement the lift on the front end of the truck, when one wheel strikes an obstruction, is only one-half of that with the conventional suspension, and the rate of lift is only one-fourth. The result is that this truck rides over cobble stones or other poor pavement with remarkable ease.

The Service Model 15 is backed by over 10 years of success in building the highest grade of motor trucks exclusively.

(Continued from Page 22.)

operation is figured as \$12.02 a day, including \$5.20 for driver's wage. As an average day's hauling is five trips with two tons to the load, the hauling cost is \$1.20 a ton, or 48 cents a ton-mile.

The gasoline record is low, 4.9 miles a gallon, because of allowing the engine to idle while unloading and loading at the freight depots. Maintenance and repairs are estimated at \$300 a year, while depreciation is figured on a minimum life of 38,000 miles.

Hauling a capacity load to Hol-yoke, a distance of approximately 10 miles, the cost is:

Operating expense (20 miles at 21.25 cents)	\$4.25
Fixed expense (½ day at \$1.436)....	.72
Driver's wages (½ day at \$5).....	2.60
Total expense of trip.....	\$7.57

Hauling two tons, the cost is \$3.78 a ton, or 37.8 cents a ton-mile.

Mr. Murray states: "The Atterbury has given such dependable service that it has never tied up our heavy haulage during the time that we have owned it."

Hoefler Ice Cream Co. Owns and Operates 23 Atterburys.

L. J. Loezere, vice president of the Hoefler Ice Cream Co., 296 Connecticut street, Buffalo, N. Y., states that of the many thousands of gallons of ice cream manufactured by this company every year the greater part is distributed by 23 Atterbury motor trucks.

Three and one-half-ton Atterburys deliver ice cream to dealers, drug stores, soda fountains, candy shops, etc. Each truck starts out in the morning loaded with 250 gallons of ice cream and sufficient ice for packing.

One truck makes 10 round trips a week during the summer to Lockport, 28 miles distant, starting with 400 gallons of ice cream. A second goes to Tonawanda, making 50 miles a day on boulevard roads. A third goes to Grantwell every day, a 35-mile trip. In Lockport, a two-ton Atterbury is maintained, which makes 60 miles a day, distributing ice cream to smaller near-by towns.

During the winter months the ice cream business falls off to such an extent that only eight of the 23 At-

terburys are operating in the Buffalo district; but these have to work harder than they do in summer. They start out with a small load—only 150 gallons—but they have to make more stops and travel greater distances, running as high as 60 miles in winter where they would only be required to cover 35 miles in summer.

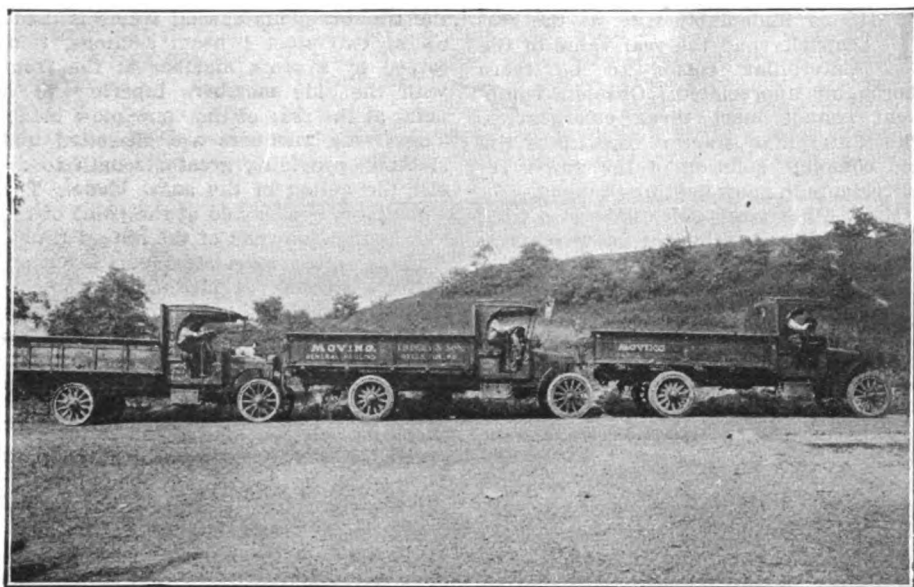
Cost Figured on Basis of Five-Year-Old Truck.

Although it is hardly fair to judge fleet costs from a five-year-old truck when compared with the newer trucks, it must be understood at the start that this is an individual record and is not an average of the 23 trucks, since only eight of the 23

a day and cost \$25.10.

Practically all of the necessary repair work is done in the company's garage by special mechanics, some for tires, others for electrical work and still others who attend to the general mechanical repairing. Such specialization has been found a paying investment by this company maintaining a fleet as large as theirs.

Motor trucks used in distributing ice and ice cream are constantly subjected to the dripping of salty water, which is very injurious to the running gear, and this fleet of trucks is worked hard while on the road. In spite of these disadvantages "the Atterburys," Mr. Loezere states, "have given us such dependable



J. B. Deily, Belleview, Pa., Owns Three Atterburys, Which He States Earn a Substantial Profit in the General Trucking Business Which He Conducts.

work the year round; however, it is fair to say that each truck has worked 206 days.

As this five-year-old truck was engaged in city delivery, it would average 35 miles a day, making a total of 7200 miles a year. When this is figured down it cost \$18.36 a day, or 52.53 cents a mile to operate, including the driver's wages. Though actual repairs on this five-year-old Atterbury were nothing for the year ending July 1, 1920, maintenance and repairs for the period were estimated at \$400.

Using the same basis of figuring, the truck making the Lockport trip will run 560 miles a week at a cost of \$186.17. In winter the trucks still running will average 60 miles

service that we let them carry the burden of our heaviest and most important work."

Atterburys in General Trucking Service.

J. B. Deily, R. F. D. No. 7, Belleview, Pa., owns three Atterburys, which he states earn him a profit of \$47.10 a day each in a general trucking business of which he is the owner.

He states that he has driven these three Atterbury trucks over some mighty rough roads during the length of time that he has owned them and that they have always come through. His first Atterbury, a two-tonner, was purchased Aug. 17, 1917, and the other two six months later.

Develops Special Snow Plow

Newly Manufactured Product of Holt Co.; Designed for Use with Holt Tractor, Meets Demand of Road Officials for Strong Rugged Snow Mover.

SNOW removal in city, suburban and country districts calls for drastic means to keep the highways and streets clear for traffic. New York's experience during February, 1920, just after the severest snow storm in 26 years, had blocked the streets so that traffic was at a standstill, was also the experience of many another eastern city after this memorable storm.

New York City was prepared for such an event, however, and with its fleet of 50 Caterpillar tractors successfully handled the situation in such a manner that the 930 miles of streets were reported cleared of snow in the first 12 hours. The Street Cleaning Department and other city officials stated that no such record had ever been approached and declared that the new snow-fighting equipment used for the first time had already paid for itself and prevented private waste and loss to business which would have reached into millions of dollars. One prominent city official stated: "Snow is going to be fought largely by machinery in the future."

THIS is undeniably true, as the real capacity and the real value of the Caterpillar comes to be more thoroughly appreciated. Obsolete equipment cannot meet these emergencies. The Caterpillar tractor constitutes the one complete solution of the power requirements in snow-fighting problem.

Many other large cities have also tried the Caterpillar method of snow removal and in practically every instance they have won the approval of city and county officials for the manner in which they have been able to batter their way through drifts and over roads otherwise impassable.

To meet the strenuous conditions of snow removal the Holt Manufacturing Co., Peoria, Ill., has developed a new Caterpillar type blade snow plow, which is able, it is claimed, to withstand the tremendous pushing strains exerted by this type of tractor and the added pushing strain of the snow being removed. The blade type of plow is considered the most effective for quickly opening up lanes through city streets, suburban highways and country roads, enabling traffic to keep moving without interruption. The latest type Holt plow is constructed on an entirely different principle from the ordinary snow plow for motor truck use, being much heavier throughout and designed to be attached to a special frame fastened at the rear, through hinged joints, to a cross member at the rear of

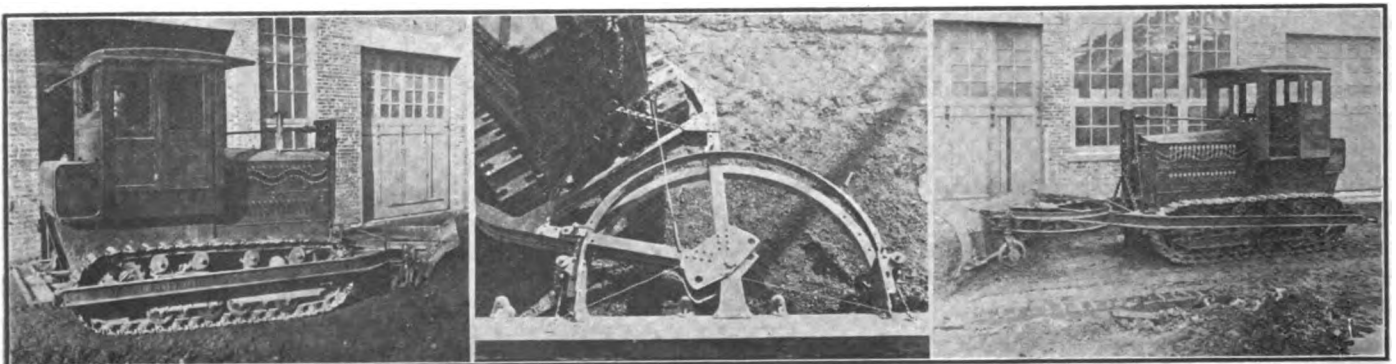
the tractor. This special frame is made up of two steel I beam sections, reinforced by a cross member at the front with the side members tapering to a point at the rear of the snow plow blade. The frame members are gusseted and rivetted, providing great strength to resist the action of the snow blade. The snow plow is attached at the point of the "V" at the front end of the hinged frame, being pivoted by a steel pin, three adjustments being provided, one at the center, a second at the right of the center and the third at the left of the center. Heavy steel plates, hot rivetted to the I-beam frame, support the contact point of the plow with the pivot pin while angle steel half-circles above and below the frame form a circle on which the plow may swing to reach the proper angle for turning the snow. Clamp plates are provided on the frame bearing on the angle steel flange of the half-circle which positions the angle of the plow with relation to the tractor, allowance being made for working the plow either right or left-handed, through proper adjustments.

The windlass which raises and lowers the plow is located on a two-section vertical steel frame which is securely bolted at the bottom to the front cross member of the tractor, rising vertically to a point above the top of the radiator. A wide slot is provided in the lower end of the frame in which fits a block rivetted to the plow frame, preventing side sway of

the plow, also allowing the pushing power of the tractor to be combined with the pulling power through the hinged joints at the rear. The plow is raised and lowered by means of a chain attached to the windlass shaft and to a hook in the vertical frame which passes through a pulley block attached to the ring which in turn is connected through two short lengths of chain, to equidistant points on the plow frame cross member. Power to operate windlass is supplied by a large hand wheel in the cab connected with a worm by an extended shaft and universal joint. The worm operates the worm wheel and the windlass to raise and lower the plow.

Pivot wheels of the caster type are positioned on the circle back of the plow blade to regulate the height of the blade from the ground and are connected through a pull rope to the cab, enabling the operator to supply sufficient tension through springs to keep the pivot wheels running at right angles to the plow blade.

The plow blade is made of low-carbon steel, especially designed with a suitable curve to meet snow requirements, while the relief blades hinged at the bottom are of high-carbon steel, and are held in position by large helical springs. This construction makes it possible for the plow to pass over stones, car tracks, etc., without injuring the blade, as the relief blades are allowed to spring back.



Left, Five-Ton Caterpillar Tractor Equipped with Holt Snow Plow, Clearing Factory Yard; Center, Showing Method of Suspending Holt Snow Plow to Side Frame of Tractor; Right, Pivot Wheels Prevent the Plow Blade from Running Too Deeply.

Scores Another for Service

Missouri Dealer Sees Marked Response to Gospel of "Public Be Pleased"—Starts With Small Capital and Wins Success in Two Years.

(By PAUL J. PIRMANN.)

THE success of any business is based on giving to the merest detail and inaugurating new ideas real service to the public, looking after its wants and plans that will cause the public to stamp you as progressive and ready to show that you not only want the business, but have the initiative to go after it. So declare officers of the Berry-Patmor Co. of Caruthersville, Mo., made up of J. T. Patmor and E. S. Berry. This company was formed two years ago under very

modest circumstances. At present it is planning to build its own home, well equipped and arranged to meet the increasing demand of its business. When asked the secret of their success, Messrs. Berry and Patmor said there wasn't "any such animal." "We haven't any secret processes," said Mr. Patmor. "We just buckled down to business, tried to anticipate the needs of the general public and met them. The rest of it was easy."

WHEN the Berry-Patmor store was opened two years ago there were two tire repair shops and two electrical stores in Caruthersville, but the new firm was not afraid of competition. Its inaugural policy was to give the best service possible and let the other fellow take care of himself.

Only recently the company showed its aggressiveness and up-to-dateness when it sent its service truck with a caravan of good road automobilists who were making a trip between Caruthersville and Kennett, for the purpose of making repairs for autoists who might get hung up on the way and by reason of break downs be prevented from making the entire trip. The Berry-Patmor Co. loaded its service truck with 32 casings of assorted sizes and 44 tubes. They left with the procession, estimated to be 200 cars, at 9 o'clock in the morning and made the first service call just two blocks from the start. This consisted of putting in a new tube. Another call for a tube came two miles out in the country. Six miles out the service men placed a cord tire and tube. About 18 miles out the truck put in another tube.

"Just think what would have happened to me if this service truck had not been with us," said the owner of the car.

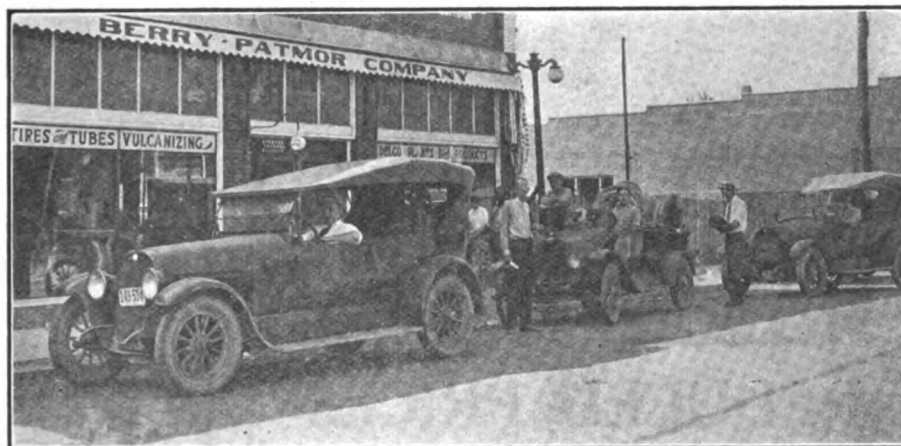
"He appreciated the service mightily," said Mr. Patmor, "and we made a real friend of him. He couldn't have made the return trip and by giving him this service he was enabled to go right along without any trouble. The timeliness and originality of the idea appealed to him as well as to other autoists on the trip and we gained their good will. They are talking about us and that's about the best advertisement we can get."

On the return trip from Kennett more service calls were made and when the repair men reached Caruthersville at night a check was made and it was found that they had replaced two casings and 11 tubes and that the receipts for the trip amounted to \$121.70. The service was greatly commented upon and many of the cars from Kennett, who had made the return trip to Caruthersville stopped

at the Berry-Patmor store for supplies before they started back for their town, and Mr. Patmor estimates that his firm received something like \$300 directly out of the trip.

The company has a Ford truck that is painted red with gold lettering, adver-

tion. As a result of this form of advertising Mr. Patmor says they can show that when they began selling Horse-Shoe tires and tubes they were practically unknown in this district, but now a business has been built up to a point where the sales of this make alone are reach-



Here is a Dealer Whose Motto Might Well Be, "Ask 'Em to Buy"—He Has Won a Well-Deserved Success.

tising Horse-Shoe casings and tubes. The truck is equipped with compressed air and a complete set of repair tools. The company gives free service to anyone within the city limits or a mile in all directions from the store, making a repair at the same charge as if the work were brought to the store. A casing is delivered three miles without extra charge and upon several occasions they were delivered six and seven miles. The company is distributor for Exide batteries and gives the same sort of service on them.

The company also has adopted some new and novel methods in advertising, having the latest model of the Edison-Dick mimeograph and addressograph, on which they prepare circulars for a list of 3000 car owners in Caruthersville and adjacent territory. The company dresses its windows weekly and makes attractive electrical displays to attract atten-

ing \$15,000 a year. In addition to that the firm is selling \$4000 worth of other kinds of tires.

A tire and battery expert is employed and he is sent to a large city plant once each year to get new ideas in the use of repairs in those lines. The company asserts that its negro helper is the champion tire changer in the state and is willing to enter a contest with any other tire changer in Missouri or elsewhere to prove the truth of this assertion. The agency of the Delco light plants is held by the Berry-Patmor concern and the store is lighted through a Delco plant.

The company advertises extensively in its home newspapers and an outstanding policy is that it guarantees all of its work and will not handle any merchandise that cannot make good in every respect, all of which has combined with efficient service to make the business an outstanding success.

TRUCK MANUFACTURERS ENDORSE WOOD-DETROIT HYDRAULIC HOISTS AND STEEL DUMP BODIES

WOOD Hydraulic Hoists

Truck manufacturers realize that every part of the equipment either standard or special must stand up under most rigid conditions, severe tests and usage, hence the adoption as standard the Wood-Detroit Hydraulic Hoists and Steel Dump Bodies by most of the truck manufacturers of the country.

The Wood-Detroit Hydraulic Hoist is so widely used that it has been called the "universal hoist" and is noted for its rugged, sturdy construction, dependability and simplicity of installation and operation.

The following partial list of manufacturers that standardize on Wood-Detroit Hydraulic Hoists:

Acason	Garford	Lewis-Hall	Republic	Swedish-Crucible
American	GMC	Locomobile	Reynolds	Tiffan
Armleder	Gramm-Bernstein	Maccar	Rowe Motor	Triangle
Atterbury	Hamilton	Mapleleaf	Sanford	Traylor
Bessemer	Independent	Moreland	Schwartz	Truck Engineering
Brockway	International (Mack)	National	Selden	Union Motor
Corbitt	International Harvester	Noble	Service	Vellie
Clydesdale	Jackson Motor	Nelson	Signal	Ward-LaFrance
Day-Elder	Kelly-Springfield	Packard	Standard	Watson
Defiance	Lange	Paige-Detroit	Sullivan	J. C. Wilson
Denby	LarrabeeDeyo	Pittsburgh Motor		

Branches, Sales and Service:

Detroit	Milwaukee	Cleveland	Boston	New York
Chicago	St. Louis	Pittsburgh	San Francisco	Portland
Los Angeles	Denver	Seattle	Philadelphia	

WOOD DETROIT HYDRAULIC HOIST & BODY CO., DETROIT, MICHIGAN.



DENBY MOTOR TRUCKS REDUCED PRICES

Effective January 1, 1922

Model 31, $\frac{3}{4}$ -1 $\frac{1}{4}$ ton		
Speedster	was \$1625	now \$1485
Model 33, 1 $\frac{1}{2}$ -2 ton	2300	1425
<i>Pneumatic tires used on the above models</i>		
Model 34, 2 ton	2600	2395
Model 35, 2 $\frac{1}{2}$ -3 ton	—	2795
Model 27, 4 ton	4200	3895
Model 210, 5 ton	4850	4295
Model 214, 7 ton	5500	4945

F. O. B., Detroit, chassis with seat

With rock bottom truck and service prices, the Denby line offers a very desirable factory connection to live dealers.

Write or wire for full details.

LET'S TALK BUSINESS AND GET BUSY.

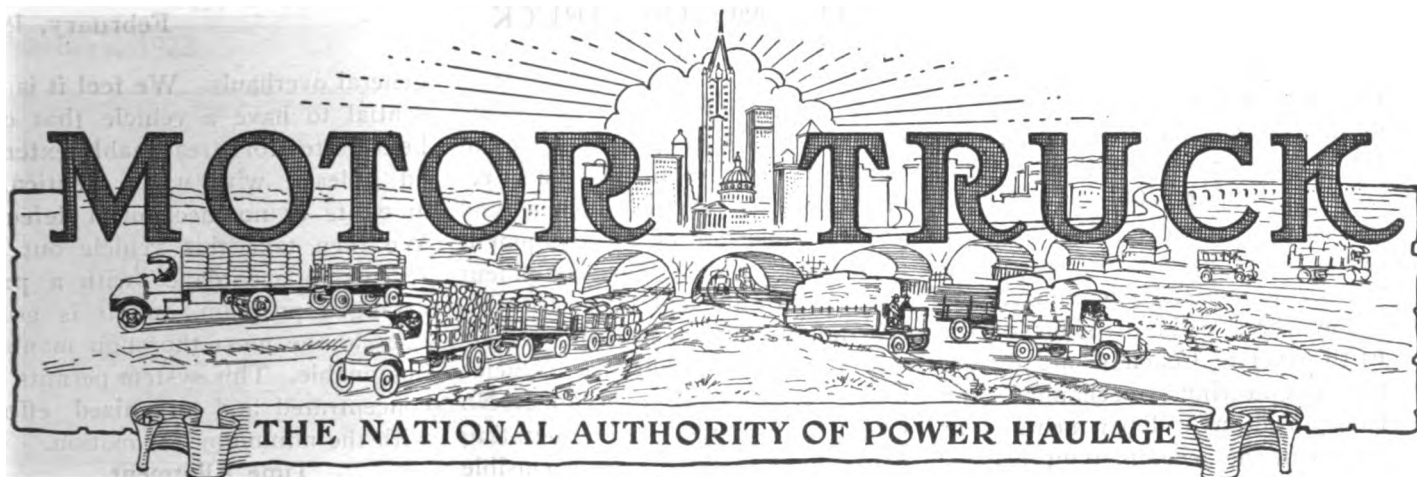
DENBY MOTOR TRUCK COMPANY Detroit.

New Bessemer Prices

We Have Made Drastic Price Reductions

1 Ton was	
\$1,700.00 Now	\$1,395.00
1 $\frac{1}{2}$ Ton was	
\$2,445.00 Now	1,995.00
2 $\frac{1}{2}$ Ton was	
\$3,285.00 Now	2,595.00
4 Ton was	
\$4,485.00 Now	3,495.00

Electric Starter and Lights Extra



VOL. XIII. NO. 2.

PAWTUCKET, R. I.

FEBRUARY, 1922.

“The Public Be Pleased”

**Fifth Avenue Coach Company, Pioneer in Motor Bus Field
Has Built Mammoth Organization Founded on
Policy of Service and Courtesy.**

(By G. A. GREEN, General Manager, Fifth Avenue Coach Company.)

UNQUESTIONABLY, the wisest policy both from a financial standpoint and the service results to the city is to entrust a single well-organized and equipped company, possessing ample resources, with the development of a unified motor-bus service. Parcelling out streets to two, three or more companies will never provide the true type of service which the motor bus can give. If the parcelling out process is adopted and the several companies are of a nondescript character with the usual type of jitney equipment, the outcome can only be chaos. The actual result of any form of competition must be multiplied fares and no transfers. With a unified system there can be no harmful monopoly, for the fare should be determined by the authorities and the company should be under public regulation, but so-called competition from a public utilities standpoint means bad service and financial failure. Cities cannot be prosperous without efficient utilities and utilities cannot be efficient without prosperity. To cite an example of the evil effects of bus competition, one need only point out London's early bus experience. This soon convinced both the stockholders and the general public as to the

unwisdom of this policy.

The policy of the Fifth Avenue Coach Company from an outside viewpoint may be summed up into two words, “service and courtesy.” From an inside viewpoint we aim to give every member of our organization a square deal in all that the word implies. With us the word “justice” is not merely an empty phrase. The “right of appeal” guarantees this. The doors of the executives' offices are always open

Ten-Cent Fare Plus Service Suits Passengers

“**I**T SHOULD be borne in mind that the financial success of the company is largely due to the 10-cent fare,” states Mr. Green. “On a five-cent basis its development would have been impossible. In saying that the bus cost per passenger carried is not less, and is perhaps greater, than that of the trolley car, I should also add that I am sure the public will gladly meet the difference since the comfort and convenience of a bus have much greater possibilities than is the case with the trolley car.”

and heads of the departments as well as the rank and file have free access at all times. We believe in cultivating constructive criticism, and with this in view frequent staff meetings are held when all members have an opportunity to express their opinions. These meetings also enable the staff to maintain that close personal touch with the management without which real co-operation is scarcely possible. Our staff officers are carefully trained. They are taken into our confidence where matters of policy are involved and their views are eagerly sought. They are most courteously treated and they in turn so treat their subordinates.

Without doubt if a motor-bus service is to realize its possibilities of financial success, it must be backed up not only by ample resources, but it must also develop a highly specialized organization. Experienced management and direction is imperative. The engineering force requires a special experience, for the demands upon the motor bus are quite distinct from the demands made upon any other type of motor vehicle. The needed traffic studies and schedule making are unique. The employees must be trained in a branch of motor-vehicle operation

with many distinct and unique peculiarities for which the operation of neither the automobile nor any form of surface transportation affords suitable training. One of the chief differences between the bus and other forms of surface transportation is the matter of flexibility.

The three main divisions of the Fifth Avenue Coach Company are the engineering, mechanical and transportation departments as shown in the accompanying organization chart. There are, of course, departments concerned with finance, auditing, purchasing, publicity, claims, etc., but these follow conventional lines and no further reference will be made to them.

Engineering Department.

At the head of the engineering department is the mechanical engineer. His duties and responsibilities are broadly outlined above. It is scarcely necessary to refer in detail to the duties of this department, as it follows closely along conventional lines.

Mechanical Department.

The superintendent of equipment has charge of all construction work, including repairs and renewals. He is responsible for the selection, training and discipline of all personnel concerned therewith. His duties and responsibilities are broadly outlined under the chart heading, "Mechanical Department."

Operating Departments.

The function of each operating department is to maintain between the annual overhauls the equipment

allotted to it. Each department is controlled by a foreman who reports direct to the superintendent of equipment. The foremen are responsible for the cleanliness and general efficiency of the equipment allocated to them. This equipment consists of sufficient buses to meet schedule requirements, plus a certain number of additional vehicles to cover general overhauls. No spares are provided. The operating department foremen are responsible for both day and night forces. They are assisted by sub-foremen and charge hands. The wages, hours of work and duties of all operating department employees are clearly shown under their personnel establishment. As previously stated, operating departments are not required to carry out major repairs. This work is dealt with by the repair department, which also furnishes the operating departments with overhauled units. The organization of departments other than general overhauls and gasoline efficiency will not be referred to, since the duties of these departments are largely of a routine nature and follow conventional lines.

General Overhauls.

A general overhaul represents a thorough inspection of every part of the body and chassis of every vehicle after each 2000 miles of service. General overhauls, or as they might be termed, "general inspections," are the most important function of operating departments. We attach great importance to our theory of

general overhauls. We feel it is essential to have a vehicle that can be operated for a reasonably extended mileage with what practically amounts to no mechanical defects. We then take this vehicle out of service in accordance with a pre-arranged program, and it is gone over in the most thorough manner imaginable. This system permits of concentrated and organized effort with the minimum lost motion.

Time Allotment.

Very little repair work is done at night. Our aim is to concentrate on general overhauls. Under these circumstances, inspections, repairs, adjustments, etc., are carried out under almost ideal conditions. It is essential that the space allotted to this class of work have abundant natural light and it must be dry. Furthermore, sufficient time must be given to enable the work to be done satisfactorily. The net result of this procedure permits of attracting and retaining the class of help required, which must be of the best.

Approximately six per cent. of our equipment is required for general overhaul. General overhauls must be completed by 4:30 p. m. each day, at which time they are scheduled for service. This means that up to 4:30 p. m. on week days we operate 92 per cent. of our equipment and after that time 98 per cent. Saturday afternoons and Sundays we aim to operate 98 per cent. There are very few cases where this is not done, assuming, of course,

(Continued on Page 105.)

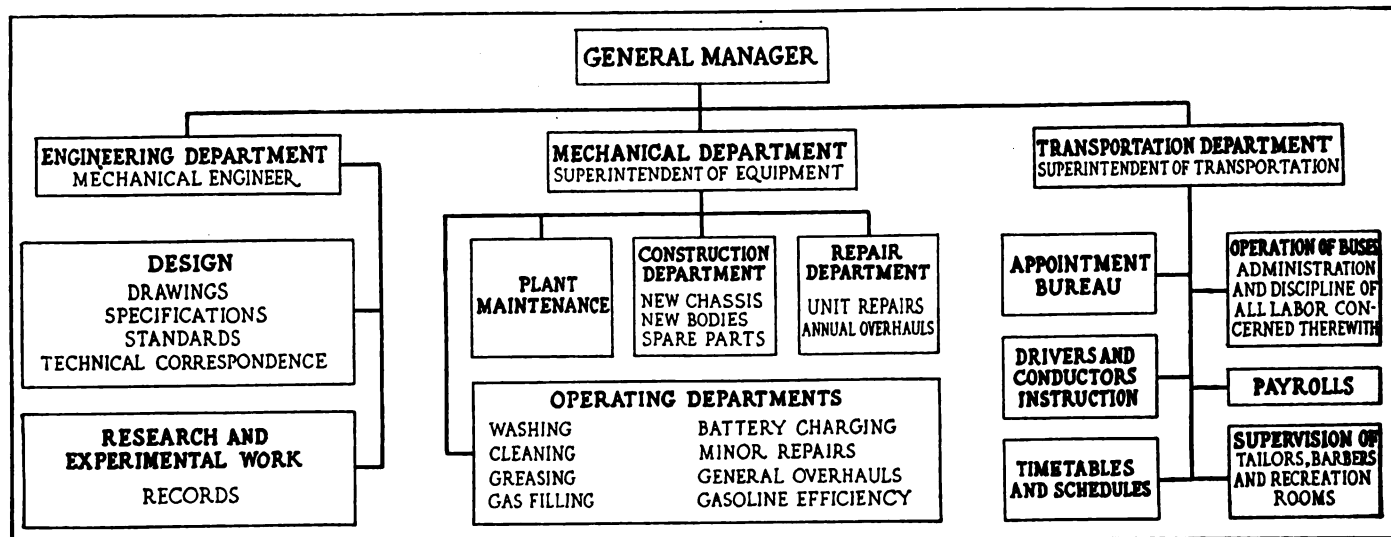
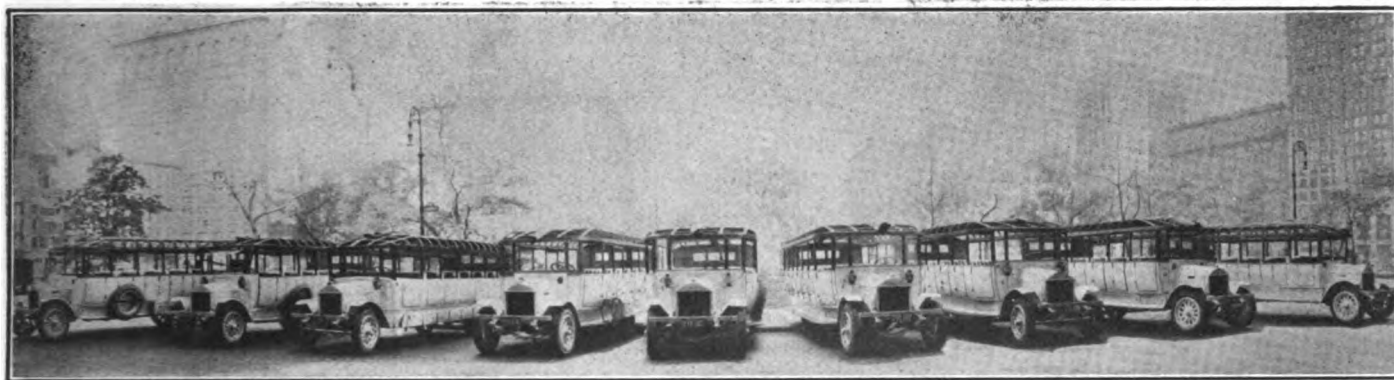


Chart Showing Manner in Which Work Is Apportioned Among the Several Departments. One of the Greatest Factors of Success in the Development of the Fifth Avenue Coach Co. Has Been Its Systematic Management.



Fleet of Maccar Busses Operating Between New York City and Suburban Points.

Service Is Important Factor

Big Maccar Sightseers Carrying Capacity
Loads of Pleasure Seekers Kept
in Efficient Condition

ALL day long the sightseer stands near the corner, sometimes with a few passengers aboard, but most of the time idle. Oftimes one wonders how it is possible for the company operating these busses to meet expenses in as much as the investment is not a little one and operating, maintenance and other charges come quite regular, varying only in proportion to the amount of active operation.

The fact of the matter is that this phase of the bus business is mostly a seasonal proposition, especially with regard to the use of the bus for excursions and the carrying of passengers to summer resorts. There are about four months of the year when the "sightseeing" business is most profitable and during this period the major portion of the business is done on Saturdays, Sundays and holidays.

IN OTHER words a bus can be laid up on the "off" days, but it is imperative that it be in working order on the busy days.

Thus, it is plain to see that the most important factor in the performance of these vehicles is service. This is particularly true of the sightseers that operate between 42nd street, New York, and Coney Island, a number of which are Maccars. The reason for the use of Maccars in the Coney Island service is quite apparent when the service offered by the Pitts Motors, Inc., distributor of Maccars, is taken into consideration.

Night Service.

In the first place the round trip, Coney Island to 42nd street is about 18 miles or about nine miles each way; the Maccar service station being located half way. On a busy day these cars make about seven round trips, the last trip being made well on in the night. As a matter of convenience the service station remains open long enough to take care of emergency calls. An

example of the kind of service rendered can be best illustrated by referring to an incident that happened wherein the engine was smashed up along with other damages. Immediately upon being notified a wrecking car was dispatched, the damaged car towed back to the station, and in less than five hours after the report the car was back in service.

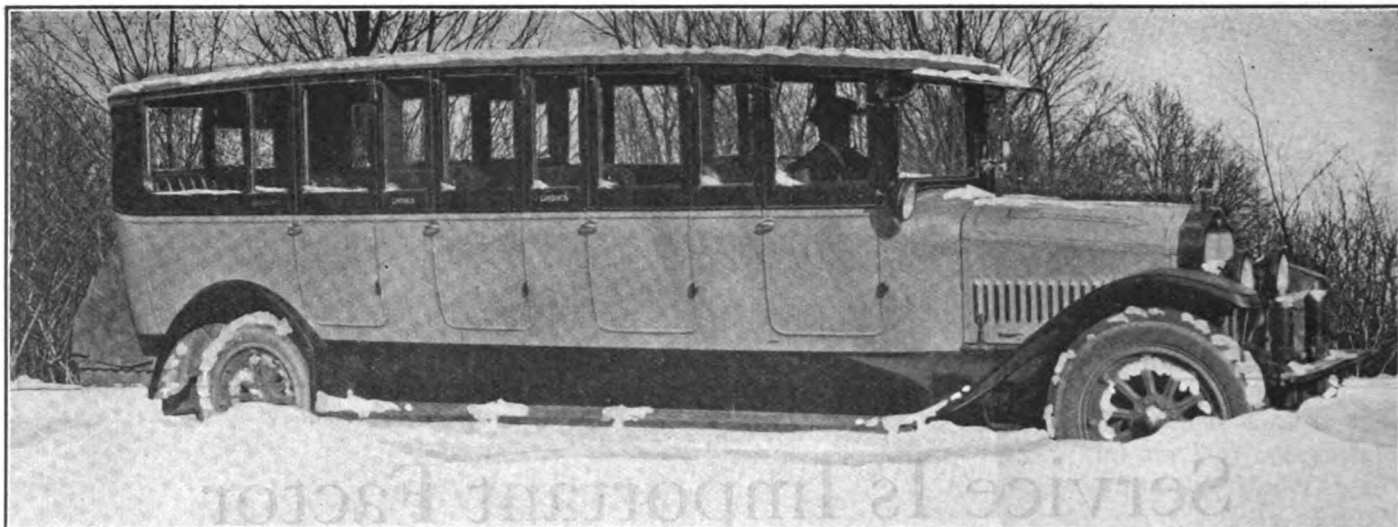
Ideal Location.

The ideal location of the service station with its complete store of necessary parts, competent mechanics, etc., is not alone responsible for the successful operation of Maccar busses of which there are more than 100 in operation in and around New York City. Mention of one of the features of a Maccar will reveal one of the reasons why quick service is possible.

The motor, clutch, transmission, radiator, pump, magneto, carburetor, dash, toe boards, brake and foot pedals, steering gear and all spark and throttle controls on the Maccar are assembled in one cradle and mounted into the frame as a unit.

By removing only six nuts and disconnecting drive shaft, brake and fuel connections, the Maccar power plant can be removed and another unit substituted in less than 30 minutes, without disturbing the driver's seat.

As to the comfort of a Maccar Sightseer the 56 inch springs and a wheelbase of 186 inches makes possible this necessary requirement. The body of the bus is fitted with combination seats, consisting of one side seat along the right side and one long seat across the rear end. Five double cross seats are on the left side of the body and there is an individual driver's seat. The gas tank is located in the left front end and is boxed. A vestibule folding front door and easy steps are other features. Electric dome lamps and buttons, polished grip handles, grooved floors, noiseless windows fitted with Pullman spring catches also contribute to comfort of passenger. The bus is nicely painted and is handsomely finished throughout. —Highway Transportation.



Various Makes of Busses Are Used with Marked Success for the Arduous Work of Passenger Carrying in Oregon. Heavy Weather Has No Terrors for the Bus Driver Who Understands the Business.

Carry 10,000 Passengers Daily

Portland, Ore., and Territory within 125 Mile Radius Served by Auto Stage Terminal Company Which May Extend Service to San Francisco.

(By EARL C. BROWNLEE.)

WITH 135 motor busses in daily operation over 16 different routes, covering every city and town of importance within a 125-mile radius of the city, Portland is realizing on every hope for the success of what is held to be a new departure in passenger transportation by automobile. Whatever success this departure results in will be the direct outgrowth of one of the most chaotic transportation problems imaginable—a situation that threatened to disrupt the scheme of rapid transit by motor bus, ruin the struggling operators and give city and state authorities gray hair trying to unravel the tangle.

Countless owners of automobiles were in the business of carrying passengers in and out of Portland a few months ago.

THEY stationed themselves at the most likely corners, congested the streets before the less important hotels and generally made themselves a nuisance not only to the city, but to the very people they sought to serve. Then a great light gleamed and the result is the Oregon Auto Stage Terminal Co., an executive organization with an imposing terminal building, which directs cooperatively the activities of the 135 auto stages over 16 lines, owned by 13 companies in which several score of individual automobile bus owners are represented.

More than 10,000 passengers each day employ the facilities of Portland's terminal and are carried back and forth between the cities and

towns on all sides of Portland. And the system is working so well that the bus is today conceded here to be a legitimate, safe, speedy and reliable method of transportation in successful competition with the network of railroads out of Portland and the numerous steamship lines on the Willamette and Columbia rivers.

Indeed, competition with the rail and water lines had much to do with the creation of Portland's present system following the spectacle of a ruinous rate war in which the three elements engaged last spring. The railroads, feeling the bite of bus and river competition, started a rate cutting war in which, perforce, the busses were rather speedily crowded

out, while the river lines went the limit with the rail systems.

The bus owners held their own on routes that the river lines couldn't reach, of course, but on the beautiful lower Columbia river highway paralleling the Columbia river from Portland to the sea, the situation for the motor owners was acute. When the rate war had done its worst the bus men came up smiling and went right back to their routes, where they had won favor because of the speed and the comfort of the great and sometimes luxurious cars they operated.

But out of the condition came a desire on the part of the operators to improve their facilities for self-protection and the demand of municipal government for rigid parking rules, legislating the busses out of the nuisance class and hastening the solution of Portland's problems.

The Oregon Auto Stage Terminal Co. is the blossom that grew from this bud of an idea. The Terminal company does not operate or have financial interest in any of the 13 companies that operate under its direction, but its membership is composed of the companies and individuals who operate busses. A terminal building, opened just adjoining the heart of the business district was erected at a cost of \$25,000 and was opened late in 1921, offering maximum facilities to operators and passengers. The structure is a thoroughly modern depot, housing spacious waiting rooms, ticket of-

fices, terminal company headquarters and a group of stores.

A wide driveway around two sides of the rear of the building gives a passageway for the stages and within this enclosure are filling stations and the like. The terminal company sells all tickets, employs all depot help and, in fact, supervises the schedules and such things for the respective owners under a rental plan that yields profits which are returned directly to the bus owners.

Instead of a helter-skelter system under which owners could pick up their passengers anywhere they choose and deliver them where the spirit moved, the new method is orderly and otherwise entirely satisfactory. With every stage activity centered at the terminal building, rates are fixed by the Oregon state public service commission, which has jurisdiction over all public utilities, and schedules are arranged by the commission so that a central court of authority is thus established from which, while the operators have an appeal, they are not apt to take exception.

The commission took over the task of arranging schedules and establishing rates on Jan. 1. The city of Portland before that time had been the authority and the arrangement did not prove entirely satisfactory. None of the local lines operate within the city, since voters disapproved the "jitney" idea some years ago. All lines operate from within the city to points outside.

The city of Portland retains authority over inspection and this ground it is covering very thoroughly, providing for the regular inspection of brakes, carrying capacity, safety and the like. The passenger is protected under a state law that is operating to the satisfaction of automobile owners, which requires that all passenger carrying machines be insured. The extent of insurance varies from \$10,000 to \$20,000 per car and covers all liability for accident or injury to passengers.

The local investment in vehicles approximates \$750,000, it is said, and the splendid local scheme has given rise to the construction of some magnificent cars, carrying as

Turning the Spotlight on 1921

Number head of live stock transported by truck in 1921.....	6,000,000
Number of street railway lines using motor buses.....	35
Number of steam railroads using motor trucks with flanged wheels.....	12
Gasoline production (U. S.) 1921 (gals.).....	5,360,014,000
Gasoline consumption (U. S.) 1921 (gals.).....	4,506,706,900
Increase in production over 1920 (per cent.).....	9.8
Increase in consumption over 1920 (per cent.).....	5.9
Tire casings produced.....	19,379,000
Tire inner tubes produced.....	24,157,000
Solid tires produced.....	377,000
Cars and trucks.....	1,680,000
Decrease from 1920 production (per cent.).....	24
Trucks.....	145,000
Decrease from 1920 wholesale value (per cent.).....	45
Wholesale value of motor trucks produced.....	134,250,000
Average wholesale price motor car 1920.....	897
Average wholesale price motor truck 1921.....	968
Average wholesale price motor truck 1920.....	1,273
Motor truck factories in U. S.....	140
States in which factories are located.....	32
Employees engaged in car and truck manufacture.....	256,000
Motor trucks.....	1,000,000
Cars and trucks owned by farmers.....	3,000,000
Farm products hauled by motor transport (tons).....	134,400,000
Schools using motor bus transportation for children.....	12,000
Motor buses in operation.....	20,000
Organized public motor express lines.....	1,500
Cities having organized motor bus lines.....	600
Freight hauled annually by motor truck (tons).....	1,200,000,000
Value of motor trucks exported.....	\$11,457,616
Number of countries to which automobiles were exported during year.....	114

many as 25 passengers, equipped with spacious and comfortable compartments for women, for smokers, for general passengers and for baggage and light parcels. Many large touring cars are employed on some of the smaller routes, but for the most part these new and huge cars are coming into use on the longer routes where passenger travel is heavy. Each bears a painted legend as to its capacity and insurance. Most of the large cars are heated.

One outstanding feature about this new Portland plan is the 100 per cent. service it renders. Throughout the recent unusual winter weather the bus lines operated on almost perfect schedule, defying conditions that under the old scheme would have sent drivers to shelter in a hurry. The only lines that did not operate were those between Portland and Hood river, over the upper Columbia river highway, where an ice blockade in places 35 feet deep over the pavement made any travel impossible. These routes cannot be resumed until early spring after the snow and ice has melted, but the local unemployed situation

is being solved by putting idle men at work clearing a 10-foot roadway over the highway as far as the county line on the East.

Schedules are maintained even more carefully by the busses than by the trains and with very rare exceptions every car departs from or arrives at the terminal exactly on time. The object of the officers of the company is stated thus: "When a passenger buys a ticket from this company he buys a guarantee that he will be put at his destination in the least possible time commensurate with safety," and it is a fact that no matter what the condition, the company keeps its promise, for in case such a recourse were necessary (as it has not been) the company is prepared to put its passengers aboard a train to complete a journey. That emergency is only anticipated and has never come to pass.

Passenger fares have not as yet been placed upon an entirely equitable basis, although the public service commission is at the moment working on that very subject. The commission has taken over a problem that had previously been solved

by the individual to a large extent and some fares are thought to be a bit out of proportion. The commission will endeavor to so adjust the rate arrangement that it can establish fares on a mileage plan, considering the conditions of roadways and other contributing factors to the expense of operation.

Thus will be overcome one of the big obstacles in the way of successful operation of a motor bus system that covers the vicinity of Portland in a well-regulated, harmonious and profitable network. It is said by operators to be a fact that their proportionate profits today are much better than they were under the old system, which had no head nor tail. There seems to be an almost total harmony, with only an occasional complaint from some disgruntled owner over the schedule established for him or over the route, he has been given. But apparently there is an honest and sincere effort to make schedules and fares equitable and there seems to be no effort or desire to limit competition, although the terminal company, with the cooperation of its members and of the city and state governments will not tolerate unlicensed competition, nor the glutting of certain profitable routes at the expense of others.

City and state governments, indeed, are cooperating now to the fullest possible extent, whereas, it was a fact they were antagonistic to the old, unorganized method of transporting passengers by automobile. Patrons appreciate this condition of affairs and the bus lines are profiting accordingly. The bus is holding its own on every route

with the rail and river lines for it has everything to offer that either of these systems has provided and it gives, in addition, greater speed, more central stations and more frequent service. There is not 10 minutes throughout the day when the rush of business is not keen at the terminal; every movement in or out of the building is made with the least possible loss of motion or time and with the least fuss or bluster. The terminal company maintains a starter, there is no congestion of cars and no discomfort for the passenger.

The most important of the many individuals operating busses under the old arrangement was A. Jaloff, who had several profitable lines out of the city, taking in territory as far distant as Astoria and Tillamook, important Oregon coast cities. Jaloff has some 20 cars on various routes and was one of the most enthusiastic backers of the plan for a centralized executive head for the stage business, as well as for a central, general terminal. Jaloff was elected president of the Oregon Auto Stage Terminal Co. and in that position he is entirely separated from the business he does as head of a company operating through the terminal. A dispute with a Jaloff bus would be handled by the board of directors just the same as if he were operating only one bus and were not an officer of the company.

Max Clark, a business man, is vice president of the company and J. L. S. Snead, one of the best known bus operators in the Northwest, is secretary. Snead is a veteran in the motor bus business and,

indeed, a pioneer. For years he has operated a fleet of sturdy Pierce-Arrows between Portland and Mount Hood resorts and summer colonies. His cars are known far and wide for their performance and they cover some of the most treacherous roads in the state. His is one line where competition, while not frowned upon, need not be feared, for Snead has kept going, year in and year out, while a dozen ambitious competitors have fallen by the wayside because of the bad roads and other such conditions that Snead has defied.

Fritz Jacobsen, another operator of busses, although on a smaller scale, is treasurer, and Raymond Gill is manager for the terminal company.

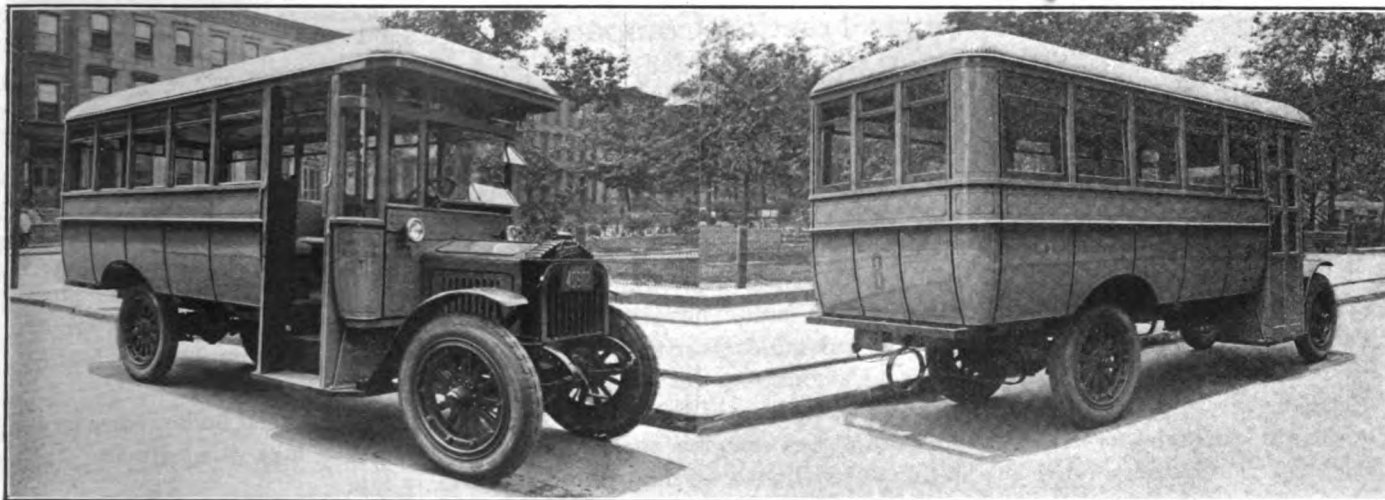
Gill, in a disinterested way, directs the application of schedule and rate regulation, seeking only to be impartial in interpreting the rules of his directors and of the city and the state. He is accomplishing his important tasks with a minimum of friction and is doing very much to put the automobile transportation system of Oregon on a basis of greater profit to the owners and greater service to the passengers and the public generally than ever it was before.

It is the opinion of officers of the terminal company that the present system is only a stepping stone to greater things. They foresee the day when routes will be extended to cover the entire state, as well as the western half of the State of Washington, carrying passengers as far north as Seattle. Road improvement in Oregon is going forward at a marvelous pace and there is very



This Picture Gives One an Idea of the Vast Size to Which the Bus Business Has Grown.

Standard Builds Special Bus Chassis



Busses Shown Have Been Used by Jersey City Operator for More Than Year with Success.

REALIZING that the country now needs and can use sufficient motor busses to keep the combined factories working overtime once that need has been sufficiently realized, many manufacturers are turning their attentions to anticipating this demand with satisfactory results in many cases.

THE Standard Motor Truck Co., a pioneer in the industry and a builder whose product has always received the favorable consideration of the purchasing public early realized the opportunities which the next few years holds for the motor truck industry and has been quietly working on a type of specially designed bus chassis which will meet the exacting conditions of heavy passenger transportation, having perfected the model more than a year ago.

The finished product, which is il-

lustrated on this page, has many special points of engineering and design to commend it, chief of which is the unusual safety feature gained by the careful and scientific distribution of weight. The gravity center is in the exact position best suited to this type of chassis, according to experiments worked out by the company engineers, and the special construction makes side sway or skidding well nigh impossible under ordinary circumstances, two features which in themselves recommend the job to those purchasers who have carefully considered the problem from all angles.

The busses shown have been used on the Bergen avenue line, Jersey City, N. J., for more than a year, and according to the testimony of owners have given universal satisfaction, never having an accident in all the time they have been oper-

ated. These busses have a capacity of 17 passengers seated and frequently carry as many more standing with safety, due to the small wheels and the low gravity center.

They are electrically lighted, have car type windows, a folding front step, the body being made by the Burnstein Body Co., Newark, N. J. The chassis on which the bodies are mounted is a Model K with 144-inch wheelbase, wheels being equipped with pneumatic tires.

Summing up the points of desirability of the Standard chassis, one might mention that they are constructed with a view to small gas consumption, have low unsprung weight, low gravity center, flexible control, low step entrance and exit, ample brake capacity, short turning radius, ample wheelbase and are so constructed that skidding is reduced to a minimum.

little bad road between Portland and any Oregon city of importance. This fact is contributing to the success of automobile transportation as well as to pleasure driving, and the bus operators will be among the first to capitalize on good roads system.

There is no good reason in the world, the officers point out, why present day motor cars cannot carry passengers as comfortably, as safely and more speedily to California than can the trains, and they actually believe that the day of more general

motor travel is in sight. With that in mind the matter of "service" is gradually being worked out. It may come to pass that the terminal company will maintain, at least under lease, filling stations and service stations along all its routes, and accommodations for its increasing number of passengers.

There has been no hitch at all in the endeavor to operate busses over the present routes, some of them in interstate commerce, too, despite that fact that the most extended

route is approximately 150 miles, and the same success is anticipated when greater distances are attempted.

Motor Transportation pays more than \$300,000,000 in special taxes annually. The house ways and means committee bonus tax would add \$120,000,000 more in gasoline and horse power levies. Motor car and motor truck owners are protesting that they should not be called upon to pay one-third of bonus cost.

Develops Amusement Resort

Northern Texas Traction Company Bridges Five
Mile Gap Between End of Car Line and
Lake with Fleet of Motor Busses.

(By NED RECORD.)

A HUGE expanse of water, 10,000 acres of it, lies nine miles north of Fort Worth, Tex. Bathing beaches and boat houses dot its shores and hundreds of camps nestle in the woods which surround Lake Worth, the municipal water reservoir. Last summer 100,000 visitors dived from the municipal bathing beach into the glistening waters of the lake and tens of thousands of non-bathers lined the bathing pavilion.

Motor busses have played an important part in the development of the lake and its amusement facilities. They have made it possible for the family without a motor car to go to the bathing beach and swim, boat or loaf in the pleasant pavilion company.

A fleet of White trucks with special bodies for carrying passengers travels over the lake road during the spring, summer and early fall.

WHEN the lake became popular as an amusement center the Northern Texas Traction Co. was faced with the problem of bridging the five-mile gap between the end of the car line north of the city and the municipal lake. Eight trucks is the solution of the problem.

From early in the morning until late at night the busses ply the long road. Each bus can carry 30 passengers comfortably and one man drives the bus and collects the fares. The "pay-as-you-enter" system is employed. The entrance door is automatically opened and closed by air pressure from the pilot's seat.

The motor line has successfully competed with the swarms of jitneys that infest the road. A much smaller fare is charged by the bus line and as the busses have better protection against heat and rain, many persons prefer them to the crowded flivvers that scoot over the rolling hills. Traction company engineers have found it more economical to operate the motor passenger vehicles than to lay rails over the five-mile stretch and add slower and more costly street cars. Because of the hilly nature of the country, much expensive grading would be required for a car line.

At present the busses are busy only a portion of the year. Plans for the addition of amusement facilities at the lake are under discussion and if the proposed municipal auditorium and amusement park are

established the busses will be put in operation 12 months each year.

"The development of our lake from an entertainment standpoint depends upon transportation to it," Mayor Cockrell recently declared, "and motordom has played a most important part in the steps that have been taken and will continue to take an important part."

Lake visitors are not the only passengers who patronize the busses, however. Many citizens have installed themselves at the lake camps permanently and the 40-mile shore line is becoming more populated each season with camps employed as residences.

The lake bus line is an example of the effectiveness of motor vehicles in emergency work. But another bus line operates in Fort Worth that has become as dependable as the street car service in some portions of the city.

Three miles east of Fort Worth lies Riverside. An unpaved road connects it with the city and as it is outside the city limits and across the Trinity river, the traction company has never extended street car service to the rapidly growing community.

A motor bus line was organized by men who sensed the opportunity. Today three big busses roll between the suburb and the big city, garnering the nickels of the populace that formerly fell to the flivver drivers with "jitney for hire" signs displayed on their windshields. The

trio of trucks, a Mack and two Service trucks, are especially equipped for passenger service. The transportation bus line is known as the Texas Transportation Co. Rain or shine the busses are in operation carrying business men to and from the business district, children to school and housewives to and from shopping centers.

The stage coach was once the favored vehicle of Fort Worth citizens when they were forced to journey in districts untouched by railroads. Many old-time residents of this city, veterans of the saddle and spur, can recall the lumbering coaches and clanking teams of the Overland Stage line that rolled over the prairies, guards armed with sawed off shotguns riding on them to protect the express shipments and the passengers from bandits.

These relics of the Wild West are gone, but in Fort Worth a modern scene recalls the romantic days. Trucks, minus the horses and the guards go through the streets, starting on overland journeys with passengers clinging to the seats. The mud stained trucks departing on the long journey between Fort Worth and Fort Sam Houston, 300 miles to the South, strongly link the past with the present for the old ranchers.

An artillery recruit depot is maintained here and the recruits are taken to the centralization point at Fort Sam Houston, which is near San Antonio. Not as romantic as

Future of Bus Transportation

(By DAVID BEECROFT, President, Society of Automotive Engineers.)

the stages of old but just as muddy and travel stained and several dozen times as efficient, the fleet of army trucks have made some remarkable runs between the two cities. The record is held by two soldier-chauffeurs of a pair of White trucks.

The round trip of 600 miles was made in 30 hours by the pair with eight hours stop at Fort Sam Houston. Twenty-two hours actual running time over muddy roads and with heavy loads of passengers on the south bound run is an exceptionally fast trip.

There are many small cities and one large health resort within a 50-mile radius of Fort Worth, which is a railroad center. Jitneys now operate to many of these places. Many road building projects are under way in this and surrounding counties and when the highways are completed it is expected that busses will replace the jitneys on some of these runs. Busses can be operated at less proportionate cost and are more comfortable and dependable.

The trucks operated on a commercial basis pay county and state highway licenses, based on the engine power of each vehicle. City regulations permit the Riverside line to unload at certain points on certain streets in the city as the city officials are not in favor of permitting motor vehicles operating for passenger purposes to operate at will over the city.

THE development of the motor bus for city or rural transportation is one of the major developments of the motor car industry today. In our large cities, where street area has not been greatly increased in the past 10 years, yet where eight or ten cities have been literally stacked one on top of the other by our skyscraper construction, it is necessary that our streets be used as economically as possible both for passenger and freight movement.

IT IS a prodigal waste of our city streets to have to appropriate safety areas in the middle of our congested thoroughfares in order to provide safety for pedestrians boarding and alighting from street cars. The motor bus by virtue of its character stops to take on and drop off passengers at the curb, thereby leaving the center of the street free for the unrestricted flow of high-speed traffic.

Another aspect of the motor bus is that the route of the bus can be altered as temporary conditions require. On any day or for a brief period of any day a bus line can be shifted from one street to another, which change is impossible with fixed methods of transportation.

In certain European cities such as London, trolley and other fixed systems of transportation are not used in some of the more congested centers. The flexibility of the motor bus is one of the at least partial solutions to the question of street congestion today.

A new department of the motor industry is springing up in the manufac-

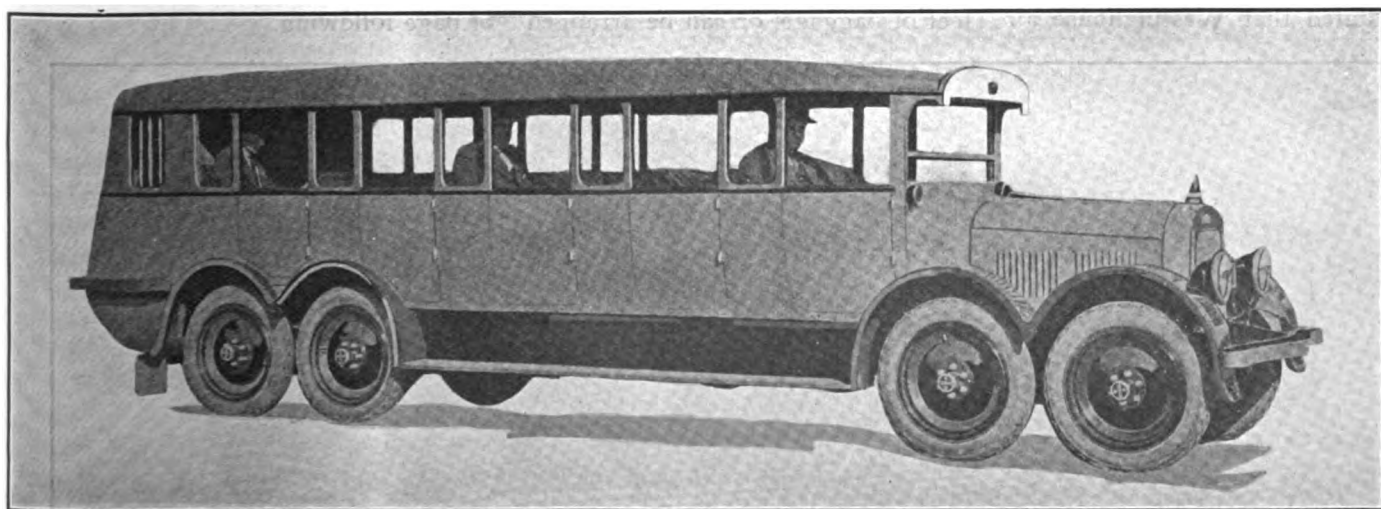
ture of motor buses for city and rural use.

Great Britain has since the war witnessed an expansion of motor bus service that is now spreading over the entire area of the country. It is now possible for a party in England to book a passage by motor bus for distances of well over 100 miles. Seats can be reserved in advance much as we do in our Pullman railroad travel of today. There are now so many bus routes operating out of London that you can reach many scores of other cities any day by motor bus. Buses have been designed that equal the comfort of the motor car and baggage-carrying facilities add another necessary factor in travel.

Special types of motor buses for rural use have been developed to give necessary passenger comfort and speed. California has been a leader in rural bus operation. The city of Los Angeles has a union depot for the scores of passenger buses that run on railroad schedules to cities such as San Diego, Bakersfield, Riverside, Santa Barbara and San Francisco. Several of these bus lines give an average speed of 40 miles per hour. You can book your seats in advance and on long trips such as Los Angeles to San Diego, 125 miles, are mid-distance stops for lunch and passenger comforts.

Other Pacific coast cities are erecting passenger stations for bus service, and these stations have all conveniences, such as rest rooms, restaurants, hospital service and news stands. Several of these bus line schedules exceed the railroad schedule. The development of a modern highway system in California has made such a bus service possible. It is only by the use of pneumatic tires that such speed schedules are possible.

EIGHT-WHEELER WINS APPROVAL



Passengers Who Have Ridden in This Newly Developed Bus Are Loud in Praise of Its Easy Riding Qualities. R. B. Fageol Is the Designer. The Hall-Scott Motor Is Used.

Designed for Rail Service

North Carolina Manufacturer Perfects Combination
Passenger Coach and Power Unit for Which
Satisfactory Performance Is Claimed.

WITH four years of practical service as a guide for further development, the Edwards Railway Motor Car Co., Sanford, N. C., has produced a model which is without question one of the best types of railway motor car equipment on the market. Developed by railroad men working in conjunction with automotive engineers, this new car is real railroad equipment and has already proved its right to be known as such.

The car, an illustration of which is shown, is supported on four driving wheels in the rear and a four-wheel pivoted pony truck in the front. These wheels are arranged similar to those on an American type of locomotive. Power is applied to all four driving wheels by three chains, this system being the Edwards design and construction for which patents have been requested.

THE designer, believing that chains are the simplest and most satisfactory method of transmitting power has apparently proved his theory to be well founded, as one of the experimental cars has been operated for more than 25,000 miles of hard service without replacing or renewing either the chains or brakes.

Incidentally, it may be stated that standard motor truck parts are used in the construction of the car, these being manufactured by the Kelly Springfield Motor Truck Co.

The braking system is very efficient, brakes being applied by turning a wheel at the driver's seat which sets the brakes to all wheels on the motor car and trailer as well. Cast iron brake shoes of railway type are used. The braking system applying the shoes against the wheels of the car simultaneously. It is stated that Westinghouse air

brakes will be supplied if requested.

The body of this unique vehicle is built with superior regard for the comfort of the passengers, its interior finish including electric lights, heavy upholstery, curtains, roof ventilators, exhaust or hot water heat for cold weather, with windows raising in railroad car style and not dropping down into pockets.

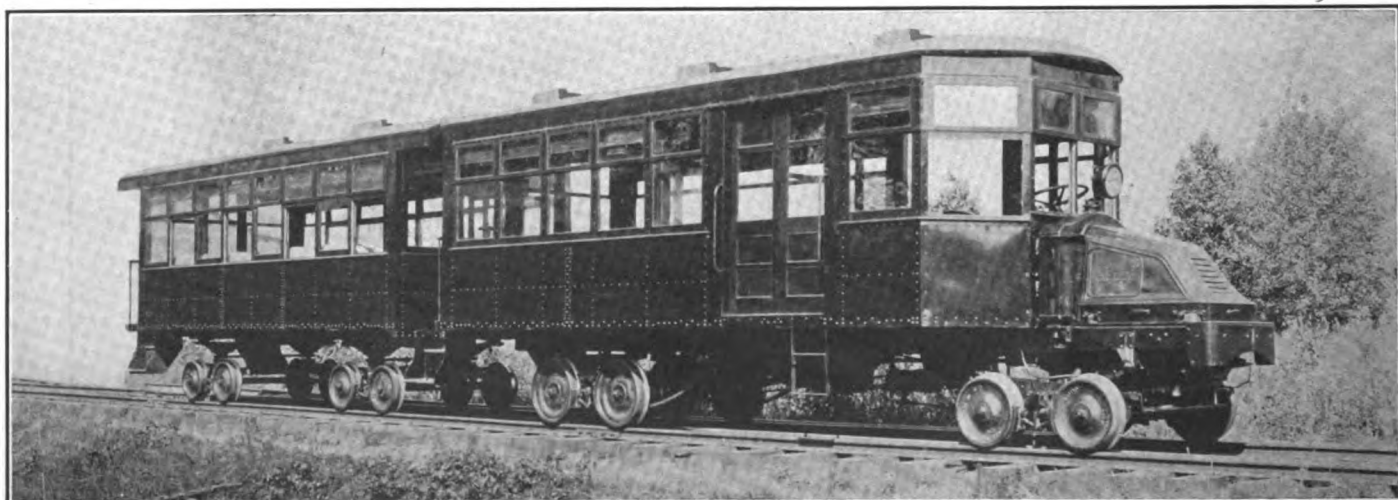
The motor, equipped with self-starter, storage battery and generator, is built by the Kelly Springfield Motor Truck Co. It has a 4½-inch bore and 6½-inch stroke, which develops more than 50 horsepower S. A. E. rating it is claimed. The carrying capacity of the car, which is built in three sizes, is as follows: Model K-35, 2½-ton capacity, seats 30 passengers; model K-50, 5-ton capacity, seats 43 passengers; model K-50 with trailer, seats 50 passengers and 70 square feet of baggage, or can be arranged

for 65 passengers without baggage.

Cars are also supplied with bodies equipped for handling freight; also with freight bodies that can be transferred to a motor truck without disturbing the load, this being most useful in heavy haulage work. In this connection it is stated that Model K-50 has power enough to handle one or two standard box cars and can be utilized for switching cars when a locomotive is not available. The manufacturer, however, states that the car is not recommended for service of this nature.

A speed of 45 miles an hour is claimed for this car with special gearing, although where grades are as high as four per cent. the car is supplied with a gear ratio which permits a speed of 30 miles an hour either forward or backward.

Details of the Edwards Railway Motor Car are given on first column of page following.



Motor Truck Units Manufactured by Kelly-Springfield Truck Co. Are Used in the Edwards Rail Bus.

SPECIFICATIONS OF EDWARDS RAILWAY MOTOR CAR.

Chassis—Engine, clutch, transmission, differential universal joints, frame, operating controls, springs, spring shackles, etc., are manufactured by the Kelly-Springfield Motor Truck Co., Springfield, O., and are known as "Edwards Type Chassis." These chassis are made of 2½-ton and five-ton chassis parts and both capacities are made in various lengths.

Engine—Model K-353 3¼-inch bore, stroke, 5¼ inches; model K-50, 4½-inch bore, stroke 6¼ inches. These engines will develop 30 and 50 actual horsepower respectively.

Ignition—Eisemann waterproof high-tension magneto, with impulse starter.

Transmission—Four speeds forward and four speeds reverse, permitting running backwards at high speed, speeds being same in either direction.

Brakes—Cast iron brake shoes on all wheels, operated by wheel at driver's seat. Westinghouse air brakes can be used if desired.

Springs—Front and rear semi-elliptic.

Wheels—The four front wheels are cast iron 20 inches diameter, weighing 220 pounds each. The four rear wheels are cast iron 24 inches diameter, weighing 325 pounds each. Steel wheels can be supplied if desired.

Wheelbase—Center of front truck to center of rear truck is made in lengths of 14 feet to 20 feet.

Frame—Press steel channel section.

Pilot—Wrought iron and steel securely attached to frame.

Equipment—Electric headlight, brackets on front and rear for markers and classification lamps.

Body—Substantially constructed of steel by experienced body builders, electric lighted, handsome interior finish.

Seating Capacity—Can build these bodies to seat from 25 to 43 people. Seats arranged the same as in regular railway coaches.

Upholstery—Seat covering to suit purchaser.

Electric Starting—Standard motor truck type Westinghouse electric starter is provided for starting the engine from the driver's seat.

Heating—Cars are heated by the exhaust from the motor or by hot water heat as desired.

Sanders—Sand boxes are provided to supply sand to driving wheels when needed.

Weight—Model K-35 car weighs 9000 pounds. Model K-50 car weighs 12,000 pounds. Trailer seating 32 people weighs 8300 pounds.

Speed—These cars can be geared to make any speed up to 45 miles per hour. This, however, would have to be regulated according to the prevailing grades over which the car is operated.

Oil Company Operates Bus Lines

WHEN the Sinclair Refining Co. began construction of its Houston refinery it was at a great disadvantage in getting its labor from the city of Houston to the site of the new plant, which is some nine or 10 miles distant from the city on the Southern Pacific railroad and the Houston ship channel. The company first tried sending men down by motor boats, but this mode of transportation was unreliable and slow. Frequent accidents occurred and not enough motor boats could be kept in service to handle the barges carrying the workmen. Neither could train service from the railroad be had.

IT WAS then decided to investigate the feasibility of using motor transportation for this work, and as a result the company placed an order for two two-ton Federal trucks with five-ton trailers equipped with 24-foot bus bodies, to carry 60 to 80 men each. These trucks were put into service, and from the first trip every official of the company was much pleased with their performance, which was so satisfactory that more equipment was soon purchased—this time three 3½-ton Federals with five-ton trailers and 30-foot bus bodies. These accommodate an average of 150 laborers per truck each trip and make the nine miles from Houston to Sinco in 35 to 40 minutes.

It was necessary that the new Houston plant be rushed to completion as rapidly as possible and for this reason over 1000 laborers are employed on its construction, all of which are handled twice daily by this fleet of five Federals and trailers, each of which makes two trips morning and night. How well the trucks handle the work was recently expressed by one of the com-

pany's officials, who said: "In the construction of our Houston refinery the question of transportation of men and material was one of our most important problems. To successfully handle it Federal trucks were put into operation to transport more than 1000 employees to the job each day, as well as large quantities of material, with most satisfactory results. This was necessary on account of the refinery site being an isolated spot without available street car or other transportation facilities. Boats were first employed with very unsatisfactory results, until Federal trucks furnished a satisfactory solution of our transportation problem."

Mr. C. E. Belt, assistant purchasing agent of the Sinclair organization, advises that during the 15 months since their purchase these trucks have been in operation continuously and have been very economical in their consumption of lubricating oil and gas, and in their upkeep. Their performance on this unusual sort of work has caused a great deal of comment from other companies with similar problems.



Nothing Very Delicate About This Bus, Which Carries 150 Laborers at One Trip from Houston, Tex., to Sinco.

Motor Busses at Danzig

IT IS stated, on the authority of United States Consul William Dawson at Danzig, Germany, that the motor bus, although a recent innovation in that place, is fast becoming popular. The first regular service was inaugurated in May, 1921, between Danzig and Heubude, a suburb having no street railway connections. The busses are run from 6:30 a. m. until 11:30 p. m., and a half-hour service is maintained during the afternoon and evening.

ON JUNE 1 a service was established between Danzig and Zoppot, a popular bathing resort, about 7½ miles from that city. A 20-minute schedule is maintained between the two points during the rush hours from 11 a. m. to 10 p. m. The Zoppot busses make the round trip in from 30 to 45 minutes, depending on the number of stops

made, and the fare during the day and early evening is 8½ marks. This may be compared with the railroad trains, which are usually very crowded, require from 20 to 25 minutes for the trip and charge a second-class fare of 2.8 marks.

Both these bus lines are maintained by the Aktien-Gesellschaft Autobus Danzig, a company with a capital of 4,000,000 marks, founded at Danzig in April, 1921. The busses, which were supplied by the Nationale-Automobile-Gesellschaft Berlin-Oberschoneweide, are of two types, single and double-deck. They have 45 horsepower and can make 18½ miles an hour, although the average speed actually developed is 15½ miles an hour. The single-deck busses have 25 and the double-deckers 50 seats and, including standing room, can carry 40 and 70 persons, respectively.

They are equipped with solid rubber tires and the rather uneven stone pavement encountered in and around Danzig subjects the passengers to a considerable amount of jolting. In spite of this drawback, however, the double-deck busses used almost exclusively on the Zoppot line are well patronized and offer on warm days the most pleasant means of reaching the beach.

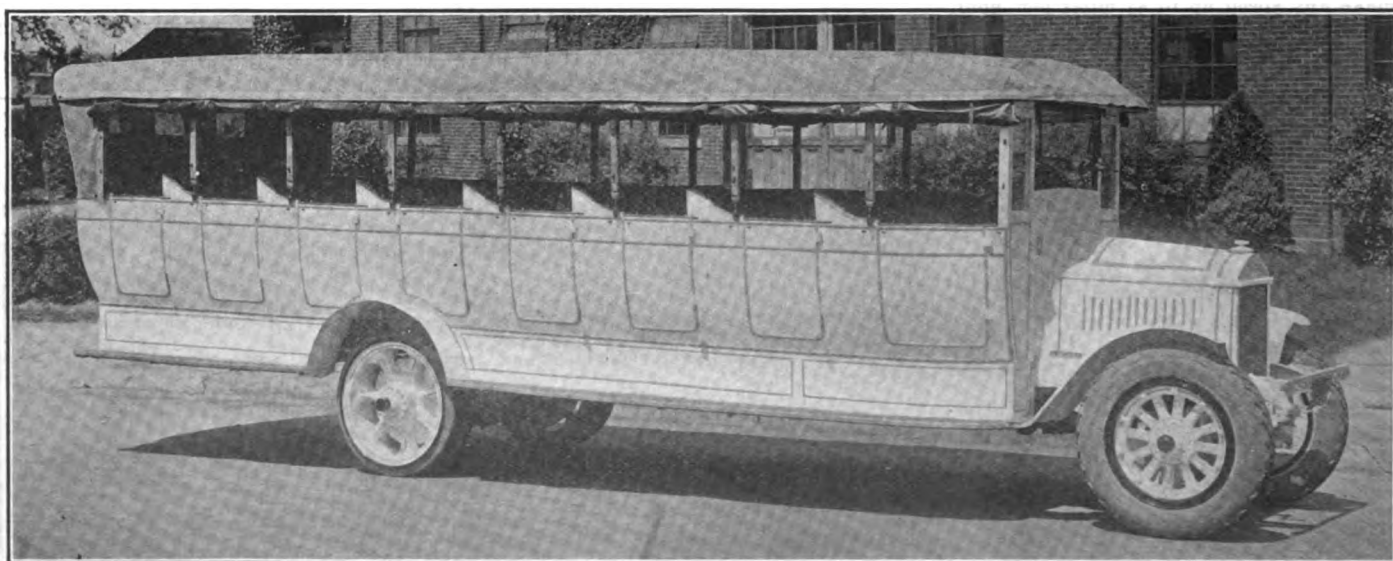
The Aktien-Gesellschaft Autobus is considering the inauguration of further services and in particular a city line at Danzig and a long-distance line from Danzig to Marienburg and Elbing. The latter service would give Danzig direct connection with East Prussia, avoiding the round-about train service via Dirschau and the Polish corridor. It would also considerably improve the city's connections with the Werder district (free-city territory) lying to the east of the Vistula. The construction of a direct railway line across Werder district is discussed.

A CONEY ISLAND "SIGHTSEER".

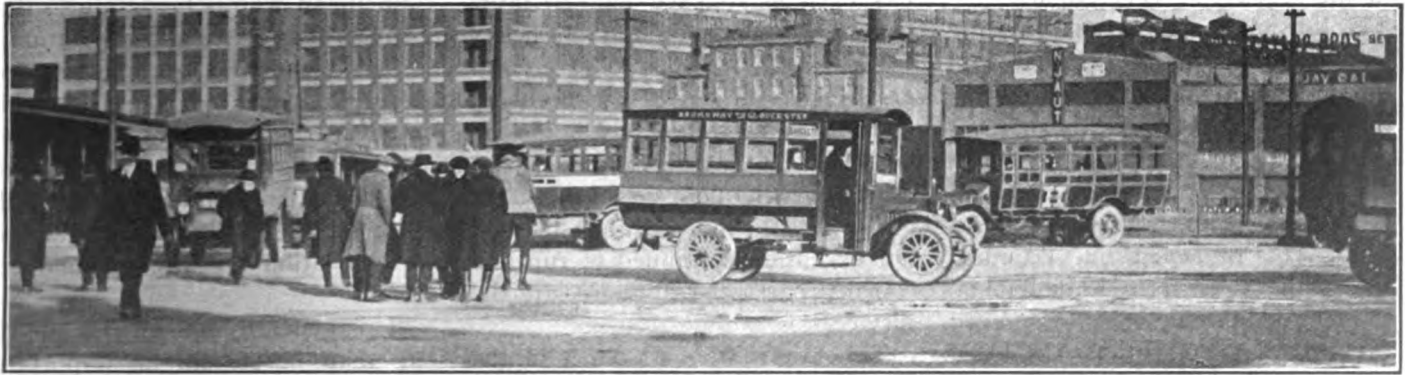
BODIES of this style are used on New York-Coney Island routes, and are built in sizes to accommodate from 20 to 42 passengers. These cars are subjected to severe usage due to the character of the work and the bodies must be very substantially built. One of the problems that has been overcome is that of the doors opening while car is in motion, and due to the extreme

width of job, the door is frequently struck by some passing object, which invariably damages the body to a considerable extent. By application of a special spring hinge the door is closed at all times, except when held open to permit entrance and exit. Car roller curtains same as are used on railway passenger cars are used; this permits quick enclosure for rainy weather; top has a

loose cover which rolls up and straps in center that can be easily unrolled and have weather protection when necessary; three-piece rain vision windshield is used and running board is attached directly to body and all can be removed from chassis in one unit. The body is built by Fitzgibbon & Crisp, Inc., Trenton, N. J., a concern that has had many years of experience.



Fitzgibbon & Crisp, Inc., is the Builder of This Roomy Body, a Type Much Used in Summer on Coney Island Routes.



Camden, N. J., Closely Adjacent to Philadelphia, Has a Well Developed Motor Bus System That Pays Big Dividends.

Philadelphia Slow to Adopt Bus

(By WILLIAM PENN BURGHER.)

"PHILADELPHIA, the 'city of brotherly love,' with its nearly 2,000,000 inhabitants, presents more wonderful possibilities and offers more physical obstacles to motor bus development than any other great metropolitan community in the world, in my opinion," said a prominent official in recent conversation with the writer. Whether his views are shared by a majority might be a question, but certainly Philadelphia, 90 miles from New York, and the terminal of literally thousands of freight carrying trucks, is still in the kindergarten class of cities using motor busses.

CURSED or blessed by a unified traction system which combines subway, surface and elevated in a maze of tracks which create a crazy quilt pattern in the geography of city and county, the Philadelphia Rapid Transit still presents transportation facilities which, by a large proportion of people are not considered adequate when compared with municipalities where the motor bus thrives.

There are probably tens of thousands who vote and pay taxes for the privilege of existence in Philadelphia that are ignorant of one of the most wonderful boulevard projects ever conceived and made a fact, because of lack of transportation facilities. This refers to the Roosevelt, formerly Northeast, boulevard system; wonderful of structure, sublime in beauty and presenting pos-

sibilities of outing trips for "the other half" seldom equalled and never excelled. Yet it still remains a motor promenade for the "upper half," because the motor bus is non-existent.

Broad and Market streets, Parkway, Chester road, the Germantown pike and many others present ideal bus transportation arteries to tap 50 per cent. of the population.

That a Columbus is needed to solve the congestion problem which exists to an extent that is having a serious and deterrent effect upon business within the county is evident. And the solution would seem to lie in the flexible motor bus rather than in the solutions which have been presented from time to time.

This is instanced in the report of the transportation committee of the United Business Men's associations, combining 75 civic organizations and thousands of members, at their annual meeting held in the Hotel Walton, on Jan. 25. Through its chairman, Sidney M. Earl, the committee recommended and the organization almost unanimously endorsed the context of the following:

"Our solution of the traffic congestion that has become so acute as to be alarming and is one which must be given the most serious consideration is elevated streets on 13th and other North and South arteries of traffic, permitting easy and accessible driveways for the motorist in and out of Philadelphia; foot

subways under Market street; abrogation of all charters and franchises by the city council of streets where the Philadelphia Rapid Transit have abandoned car service. We specifically mention in this respect Race street, Vine street and Callowhill and their conversion into one-way automobile highways."

Other matters followed, but a reference was made to the valuation of the traction company's properties which were fixed in its report at \$290,000,000, ending with this illuminating sentence, which is one of the arguments for motor bus service in Philadelphia: "The Philadelphia Traction Co. cannot pay dividends upon this physical valuation with a seven-cent fare."

Cash fares in Philadelphia on the Philadelphia Rapid Transit system are seven cents, with an additional three cents for an "exchange," which in other cities is more commonly termed a "transfer." The transfer exists, but experience has taught the average Philadelphian that a ride up Market street with a business objective north or south of that principal thoroughfare requires the additional payment of three cents, or a 10-cent fare to reach his destination.

The motor bus with a 10-cent ticket would prove a solution of this extra fare problem, which is one keenly resented by the street car riding community. Motor busses directly tapping these business sections would by reason of their time-

saving service, be very popular.

No obstacles are presented by the city or county administration, and the city and county are one by the way in existing legislation or ordinances covering motor bus transportation, but the privately owned wild cat, smelly jitney as existing in San Francisco, or even in Camden, across the river from Philadelphia, would undoubtedly meet organized and strenuous opposition.

The physical difficulties are many for Philadelphia is a "one-way street" city, resembling New Orleans much in this respect, due to the narrowness of the streets, which is true of nearly every old city in the country. This applies principally in Philadelphia to the down town or central section. Market, Broad, Arch and others are two-way streets, but Chestnut, the Fifth avenue of the city of William Penn, and Walnut, graced by the Bellevue-Stratford, the Ritz-Carlton and the lower financial district, are also one-way.

For example, you may drive down or east on either side of the single standard gauge Philadelphia Rapid Transit track which divides Chestnut street, and if a careful, skillful driver and not inclined to nervousness, the inch or two between your tires and the curb on the one hand and your fenders and the street car on the other, makes a desirable motor path. The same applies in all of its physical characteristics to Walnut street, except that one may drive only west.

As in Los Angeles, left hand turns within a certain zone are prohibited, so that the difficulties presented to motor bus operation while but few, and they have been named, are problems which must be solved before an efficient motor bus service could be successfully maintained.

The storm and blizzard of Jan. 28 last, when more than 12 inches of heavy and wet snow, driven by a 55-mile gale, piled up in 18 hours, tied up the street car facilities and thousands of Saturday shoppers and theater goers had the choice of taxis, walking or spending the night at a down-town hotel.

In Camden, where the motor bus

has been established and 50 large passenger cabs mounted on heavy truck chassis are operated, commuters stepped off ferries and with but little delay arrived safely home via busses. Street car service was abandoned or infrequent on a few of the lines, but the busses almost without exception continued to run and Camden has come to appreciate the service.

This was not overlooked on the Philadelphia side of the river, where the press of the city commented upon the efficiency displayed by the gasoline driven busses.

The jitney some years ago made a bid for public favor during one of the periods when the Philadelphia Rapid Transit was in disfavor with

councilman who is favorable to this form or method of transportation.

"In considering the question of motor bus lines for the Roosevelt boulevard," says this authority, "the natural thing to do is to compare the conditions in Philadelphia with those in cities where such means of transportation are already in operation.

"It is generally known and admitted that busses fill an important place in the transportation systems of such cities as London, Paris and New York with marked success. Coming nearer home, we may say that the bus has made itself almost indispensable in our sister city of Camden.

"If busses are successful in the



Sightseer on Chestnut Street. Philadelphia Living Up to Its Speed Reputation Has Been Somewhat Backward in Recognizing the Motor Bus.

the street car riding public. Little was done, however, as certain interests succeeded in getting a bill through the City Council placing a yearly tax or license of \$50 on each such jitney, and it was but a short time until they had disappeared from the streets and left the Philadelphia Rapid Transit with its monopoly.

This is the sole legislation against this form of transportation. if legislation it could be called, and except for permission from the city to operate, which, investigation develops would amount to nothing in the way of opposition from that quarter after the license had been paid; a bus service could be started tomorrow.

The following summary of the situation is the statement of a local

cities enumerated above, why would they not also prove of a distinct advantage to the residents of Philadelphia?

Compare the conditions in regard to passenger travel in Philadelphia and Camden. The busses were instituted in Camden because of a boycott by the public against the trolley company. At first they charged a few cents more than the fare by trolley—and the people paid the rate.

"After the most of the indignation against the trolley company had passed and conditions were on a more normal basis, the busses, ever increasing in number, reduced their fare to the same rate as that charged by the trolley company. Later the

(Continued on Page 103.)

Charges Six-Cent Fare

High Grade Equipment Economical and Efficient
Says Albany Operator Who Competes with
Traction Company and Makes Money.

FIVE years' experience in passenger bus operation taught the Woodlawn Improvement Association Transportation Corporation of Albany, N. Y., owner of the familiar "W. I. A. T." busses in the capital city—that to work on a six-cent fare basis the strictest operating economy was necessary. The executives of the bus line early realized that there was no economy in cheap equipment and therefore nothing but high grade truck chassis were considered for the work.

A YEAR ago it was seen that the firm's equipment gradually would need replacement and therefore a comprehensive investigation of better grades of trucks was undertaken. After actual operating tests a two-ton Pierce-Arrow dual-valve chassis, upon which was mounted a Schaeffer open type bus body of 25-passenger seating capacity was purchased. This modern type of truck with its very great and flexible flow of power and its marked operating economy proved so successful that four additional Pierce-Arrow units were installed.

During the first 5000 miles of service the performance of the initial Pierce-Arrow unit was watched closely. A check of the records showed that the dual-valve travelled

eight miles to a gallon of gasoline and 120 miles on a pint of oil. Some of the trucks of the competitive make required a gallon of oil to go the same distance and also considerably more gasoline, it is claimed.

The conditions under which these busses are operating are very severe, many steep grades being encountered which run as high as 10 per cent, and 15 per cent., and the busses at the present time make a great many stops in covering the routes within the city limits. The worst condition that these busses have to contend with is to climb State street hill, which is the main street in Albany, and on which the traffic is very heavy. This hill is accomplished in second gear with as high as 65-68 passengers aboard.

In condensed form the performance of these Albany busses would be about as follows:

Miles per day.....	125 to 130
Trips per day.....	17
Hours per day operated.....	17
Miles per trip.....	8
Miles per gallon of gasoline.....	7½
Miles per pint of oil.....	120
Passengers per day.....	800 to 900
Average daily revenue.....	\$50
Revenue per passenger of "fare".....	6c

These busses have been in continual operation for the last four months and during about 18 000

miles not a trip has been lost nor has a bus been laid up.

Another exceptionally interesting Pierce-Arrow installation is the bus line operating between Toronto and Hamilton. On this installation, which is composed of two Pierce-Arrow busses, the owner at first decided that the all-steel street car type of bus built by the G. C. Kuhlman Car Co. of Cleveland was too expensive and he purchased a Pierce-Arrow chassis and had a wood and steel body built. This was operated for about 60 days, after which it was decided to purchase the all-steel job, which has justified the added expenditure.

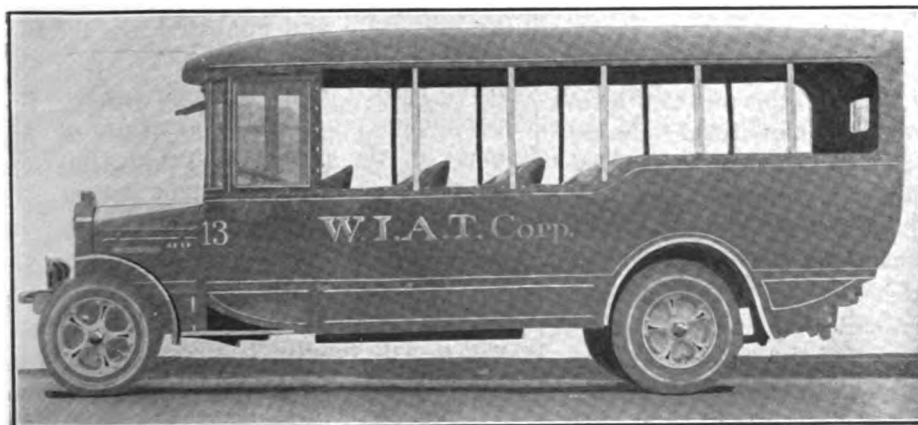
Record of Performance.

Miles per day.....	200
Hours operated per day.....	20
Miles per gallon of gasoline.....	7
Miles per gallon of oil.....	292
Miles per trip.....	90 to 100

UDYLITE INCORPORATES.

The Udylyte Process Co. was recently incorporated and is now in production. The Udylyte process has been perfected after several years careful research work. It is claimed to be revolutionary and to be very beneficial to the trade. It is an electrolytic process for application of cadmium which, when applied to steel, iron malleable or cast, will prevent rusting.

The personnel of the company is composed of men who are well known in their respective trade fields: President, Kent Blackledge; vice president, Hugh Hill; treasurer, Willis B. Dye; secretary, Sigman A. Thalman; sales manager, M. E. Louth. Mr. Louth will also direct the advertising and it is understood that an educational campaign will soon be started in the various trade papers.



Pierce-Arrow Busses Have Been in Continual Operation for Four Months Over Albany Streets Without Missing a Trip in That Time.

HERE and THERE

Truck Group Against Added Tax Burdens of Any Kind

**Philadelphia Motor Truck Body Says Trade Now Is Heavily Assessed.
Claim When Extra Money Is Needed Officials
Call on Automotive Industry.**

PHILADELPHIA, Feb. 15.—The Philadelphia Motor Truck Association at the regular monthly meeting held at the Adelphia hotel went on record against the policy of state and national legislature bodies of selecting the automotive industry as a victim for additional tax burdens whenever extra money is wanted for any public purpose.

The matter was brought before them by the secretary, W. H. Metcalf, who read a telegram from the National Automobile Dealers' association asking the Motor Truck association to communicate with United States senators and members of Congress from Pennsylvania objecting to the proposed gas and horsepower tax on automobiles in order to raise money for the soldiers' bonus bill. Mr. Metcalf stated that the automotive industry was not opposed to the soldiers' bonus, but it was opposed to being made a victim to carry a large portion of that burden when only a few other lines of business were similarly affected. He said if the proposed additional tax of \$120,000,000 a year were imposed the automotive industry would be paying \$450,000,000 a year in various state and national taxes.

Mr. Metcalf stated that the association was trying to protect dealers and owners of cars, both passenger and truck, and that he had wired national senators and members of the House, recommending that a general sales tax be imposed instead of the taxes on a few industries. A

communication was also read by the secretary from the New Jersey Automotive association relative to the New Jersey state senate bill No. 15, proposing to increase motor truck licenses on a scale ranging from a minimum of \$4 increase to a maximum of \$230 increase, according to the capacity of the truck.

The New Jersey Automotive association asked the cooperation of the Philadelphia organization in combating this bill, which was of the same character as that fought by the Pennsylvania motor truck men at Harrisburg last May, when they secured satisfactory adjustments.

Mr. Metcalf said that the campaign started by the Philadelphia Motor Truck association last summer for the organization of motor truck associations in the eastern part of the state was bearing fruit, as an association had been formed

at Harrisburg with 35 members, and movements were on foot to the same end at Allentown, Wilkes-Barre and Scranton.

Thomas K. Quirk, the new elected president, indorsed all that the secretary had done in these matters and thanked him for his activities. Walter Y. Anthony, retiring president, expressed his appreciation of a gift from the association at the last meeting in recognition of his services of the previous year.

The president announced the appointment of committee chairmen as follows: Legislative committee, F. H. Williams; legal committee, Judge Eugene C. Boniwell; membership committee, William J. Barry; speakers' committee, George B. Shearer; good roads, J. M. Zimmerman; traffic committee, Herman Schwacke; entertainment committee, R. Arthur Bittong; publicity committee, W. B. Bray; reception committee, W. T. Bosworth; special committee on used motor trucks, Charles F. Wolf.

RUSH HIGHWAY WORK.

WASHINGTON, D. C., Feb. 14.—Highway construction will not be delayed by the requirements of the new federal highway act. The federal highway system will consist of roads not exceeding seven per cent. of the total in any state, designated by the state and approved by the secretary of agriculture. Work is being rushed by all the highway departments on the preparation of maps of the proposed system, but naturally such an important matter will take some little time and consideration. The government authorities will insist that important through routes meet at state lines which will require conferences between authorities of different states.

Thus far development has been satisfactory it is stated.

FRANCE TO USE BUS ON RURAL RAILWAYS

LARGE automobile busses are to replace steam locomotives on short rural railways in France. Instead of having rubber tires, rims with flanges will be placed on the wheels, so that they can travel on the rails. The powerful motors, with bodies holding from 15 to 20 passengers, will pull two freight cars at a speed of 10 miles an hour.

Will Show Performance of American Built Commercial Vehicle

Service Truck Representatives Conducting Tests in Poland to Prove Superiority of Product Prior to Shipping \$3,500,000 Export Order.

WABASH, IND., Feb. 15.—At least one way in which Poland will spend part of \$10,000,000 in building up its war department will depend largely on the reports to be sent back to the United States by M. C. Randall, for a number of years in the experimental department of the Service Motor Truck Co. here, and Harry McGuire, a world war veteran, who are in that country at the present time as representatives of the company, which has a \$3,500,000 contract with the Polish government. Contracts totaling \$10,000,000 were entered into recently by the Polish governments with different American firms, the business being on a credit basis.

The two men left here last December for Poland, shortly after a contract had been closed with that country to provide 1300 trucks. The trip lasted for three weeks. They reached Warsaw, Poland, Jan. 10. Prior to their leaving here four motor trucks had been shipped. The trucks were assembled as soon as the men reached Warsaw and a test, which will last for three months, was started.

The four trucks will be driven thousands of miles during the test over roads in Poland and surrounding countries, with weekly reports being provided the local company on their performance. Representatives of the Polish war department will be with the two men on these trips and any changes which are found necessary in the construction of the trucks will be made here before work on the remainder of the order is started, according to officials of the company.

Before leaving here all of the trucks will be assembled and subjected to the usual road test. They will then be knocked down, crated and shipped. The two Wabash

men are expected to remain in Poland until the first shipment of these trucks is received. They will assist in the assembling of the trucks and will instruct and teach members of the Polish army the details regarding assembling and operating the trucks.

While only cablegrams have been received here up to the present time from the demonstrators, officials of the truck company say that in these brief messages the Polish government officials have expressed themselves as well pleased with the performance of the trucks on the first tests. Camera equipment was sent with the demonstrators and they were instructed to take as many pictures as possible, showing conditions in the country, returning the pictures here as soon as possible.

The trucks to be provided the Polish war department on this order are all to be of the 1½, two and 2½-ton capacity, with the majority of them of the two smaller sizes. The first four trucks shipped included

one of each size, in order that all of the sizes could be tested, and it will be shown which of the trucks was the best fitted for the work for which they are desired.

The complete order will amount to \$3,500,000, according to officials of the Service Truck Co. here, and a number of Indiana firms will benefit, among them being Midwest Engine Co. of Indianapolis, Oakes Co. of Indianapolis, Pressed Steel Products Co., Michigan City; Ross Gear and Tool Co., Lafayette, Bimel Automobile Co., Portland; Malleable Iron Co., Muncie; Malleable Iron Works, Kokomo; Muncie Foundry Co., Muncie; Western Forge Co. and Marion and Fairmount Forge Co., Fairmount.

Parts for the trucks will be made by these companies, and they will receive payment from the local company, instead of direct from Poland. All of the trucks will be shipped direct to Warsaw, Poland, for assembling and inspection, before being distributed to the various corps of the Polish army.

The contract between the local company and the Polish government was signed by R. E. Taylor, special representative of the company, and the minister of war in Poland, Kazimierza Sosnkowsei. Mr. Taylor returned here early in December last year with the contract.

HAS R. R. DIVISION.

WABASH, IND., Feb. 15.—The Service Motor Truck Co. announces the formation of a railroad division devoted to the production of gasoline driven railway motor coaches.

This company, which early saw the trend of the times, has specialized for some time in the adaption of truck principles to the railway coach and has several successful designs already running on different railroads which are stated to be giving unusual satisfaction.

The vast amount of experimental work incidental to this kind of development is said to have been productive of far reaching results and the engineers feel that they have arrived at a definite working basis.

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TRUCK DRIVERS ASK CLOSED CAB COMFORT

RAIN trickling down a driver's neck, snowdrops splattering his cheeks, or a raw biting wind numbing his fingers and squinting his eyes have a great deal to do with the efficiency of his work and the dollar performance of the truck he is intrusted with. It has been found by a survey of the truck owners of the country that the truck drivers of today are several laps ahead of the passenger car owners in their indorsement of the closed type of body.

Forest Roads Figure in Appropriation

Fifteen Millions Voted to Aid in Development of Vast Tract of Timber Land.

WASHINGTON, D. C., Feb. 15.—Fifteen million dollars has been apportioned by the secretary of agriculture among 27 states, Alaska, and Porto Rico, for the construction of national forest roads and trails. Of this sum \$9,500,000 known as the "National Forest Highway Fund" is set aside for roads of primary importance to states, counties and national forest communities, while \$5,500,000 constituting the "National Forest Development Fund," will be used for the construction of roads and trails needed for the administration and utilization of the forests themselves.

These appropriations, forestry officials state, will give a new impetus to the work of opening up vast tracts of valuable timber and areas of scenic beauty for the use and enjoyment of the American people.

The development of roads and trails throughout the forests will aid materially in fire protection. At present there are large areas of trackless wilderness within the national forests that cannot be reached by trails. When lightning storms sweep over these inaccessible areas heavy fire losses of public timber often occur.

Foresters say that speed in reaching a forest fire is just as important in protecting the country's forests as is speed in city fire protection.

In the past construction of many urgently needed forest roads has been deferred for lack of sufficient funds. Much of this work can now go forward. The forest service estimates that more than \$100,000,000 will be required to supply a thoroughly adequate transportation system throughout the 156,000,000 acres within the national forests.

The distribution by states of the national forest development and national forest highway funds is as follows:

BIG FUTURE FOR TRUCK INDUSTRY

THERE is no reason for having anything other than an optimistic view of the future, asserts Frank W. Ruggles, president of the Ruggles Motor Truck Co., who was in Chicago for the auto show.

"It is true," said Mr. Ruggles, "that the public is going to buy trucks—must buy them if they are going to continue in business—but they are not going to pay unreasonable prices. Business men today are looking closely to costs, and the truck that can show them the greatest saving in transportation is the truck that will get the order."

State	National Forest Highway Fund	National Forest Development Fund	Totals
Alabama ..	4,880	5,799	10,679
Alaska	970,271	50,222	1,020,493
Arizona	598,189	280,722	878,911
Arkansas ...	70,365	72,573	142,938
California..	1,460,871	703,822	2,164,693
Colorado ...	717,058	336,360	1,053,418
Florida	25,118	8,730	33,848
Georgia	13,355	20,347	33,702
Idaho	1,097,894	1,088,656	2,186,550
Maine	2,760	4,754	7,514
Michigan ...	3,638	6,220	9,858
Minnesota ..	60,929	65,621	126,550
Montana ...	878,886	574,615	1,453,501
Nebraska ...	11,065	11,159	22,224
Nevada	207,984	55,377	263,361
N. Hampshire	35,294	24,276	59,570
New Mexico	458,258	219,652	677,910
N. Carolina..	27,856	46,984	74,840
Oklahoma ...	5,645	8,764	14,409
Oregon	1,157,109	718,555	1,875,664
Porto Rico ..	1,454	5,344	6,796
S. Carolina..	1,572	8,704	10,276
S. Dakota ...	77,553	64,139	141,692
Tennessee ...	20,896	23,243	44,139
Utah	371,776	164,258	536,034
Virginia ...	26,140	46,512	72,652
Washington	708,133	602,889	1,311,022
W. Virginia	6,051	14,602	20,653
Wyoming ...	479,000	267,101	746,101
Totals....	9,500,000	5,500,000	15,000,000

WILLYS TRUCK.

DETROIT, Feb. 14.—A new commercial car chassis to be marketed through all Willys-Overland dealers will be produced within the next two months. Newly designed bodies to the number of 40,000 will be made to the order of the Overland Company by the Martin-Parry Corporation, York, Pa., it is announced.

G M C Opens Atlanta Ga. Sales Agency

T. K. Johnson Heads Branch Which Will Handle Entire Distribution for South.

ATLANTA, GA., Feb. 14.—A direct factory branch of the General Motors Truck Co. of Pontiac, Mich., was opened today in Atlanta for the distribution, sale and service of GMC trucks in the southeastern states.

This branch will take the place of the Southeastern GMC Truck Co., which has been the distributor in this territory. The factory branch will occupy the same sales and service station in Atlanta at 42-48 East North avenue.

T. K. Johnson, for the last four years general manager of the Southeastern GMC Truck Co., has been appointed manager of the factory branch. Mr. Johnson is very well known all through the territory and his intimate association with the GMC distribution will make him particularly well qualified to carry on his work in his new position.

V. H. Day, general sales manager of the General Motors Truck Co., who is in the territory to assist in opening the branch, has announced that the Atlanta branch will continue the same policies which have built up the reputation of GMC trucks in the southeast and that every facility for servicing these trucks will be made available at Atlanta.

In addition, the General Motors Truck Co. will take over the Charlotte, N. C., branch of the Southeastern GMC Truck Co., and will operate it also as a factory branch under the supervision of Atlanta.

(Continued from Page 75.)

By the new arrangement Charles Guernsey, former chief engineer, becomes general manager and chief engineer of the railroad division. Walter M. Petty, former assistant chief engineer, becomes chief engineer in charge of all matters pertaining to the motor truck end.

Hampden Motor Truck Corp. Organizes

Holyoke Concern, Headed by R. D. Bloom Plans Manufacture of Two-Ton Model.

HOLYOKE, MASS., Feb. 14.—The Hampden Motor Truck Corporation was incorporated for the purpose of building and operating a manufacturing plant in the vicinity of Holyoke, Mass., to manufacture medium priced high grade commercial motor vehicles, all of which will be under the direct supervision of R. D. Bloom, who has had approximately 10 years valuable experience in the commercial vehicle industry in the middle west, it is stated.

After careful forethought and analysis the corporation purchased a very desirable tract of land, consisting of approximately eight acres in Willimansett, near Holyoke. The company has buildings covering approximately two acres of floor space, having a capacity of about 5000 trucks per year. This location is considered ideal as there is approximately 633 feet frontage on the main line trackage of the Boston & Maine railroad, which will prove very advantageous in receiving raw material and merchandise by rail. The delivery of the finished product can be made under its own power to any part of New England.

The corporation proposes to manufacture a high-grade standard two-ton motor truck which will retail at \$2000 or less. The truck will be assembled from standard parts, for the reason that it eliminates the expenditures of several hundred thousand dollars that it would cost to equip a factory with machinery, dies, tools, jigs and fixtures, and several months in experimenting in the manufacturing of any unit assembled into the finished product.

Mr. Bloom's experience with other motor manufacturing industries should eliminate a great deal of lost time in getting under way and in producing high quality commercial vehicles in large quantities,

VAMPIRES CAN WALK TO WORK—OR ELSE—

BECAUSE hundreds of young girl "vamps" in Chicago were found lining Sheridan road every morning to smile their way into the automobiles of business men bound for the loop district, police women supported by a mobile force of the best looking policemen, dressed in citizen's clothes, are assigned to tour the boulevard in cars, the destination of the machines to be the police station, instead of the loop. The assumption being that the "vamp" is so simple as to mistake a policeman for a "wine-buyer." Hardly.

since all designs, specifications and detail drawings are now complete and the company anticipates production in the near future of a motor truck of advanced engineering which will command the attention of motor truck buyers, it is stated.

The corporation has a well formulated plan for the distribution of its products through dealers and distributors in cities and towns of approximately 10,000 population and upwards throughout New England first. This will mean concentration, which should prove a great factor in the success of the enterprise, and, as conditions warrant, this plan is to be extended. This method of distribution is to be adhered to throughout the entire United States and foreign countries.

In carrying out this plan and policy of distribution the corporation's products will be disposed of by men closely allied with the industry who are educated thoroughly to the point of being fully conversant with each and every unit assembled into the product.

The directors are: J. H. Woods, F. G. Burnham, C. P. Lyman, C. H. Collins, R. L. Davenport, and the chief engineer is S. B. Sanford, A. S. M. E.

Slight Increase Shown in Truck Export

Report of Automotive Division, Department of Commerce Notes Improvement.

WASHINGTON, D. C., Feb. 13.—Almost every item of the automotive exports for December shows an improvement over November, according to a report of the automotive division of the Department of Commerce. Shipments of passenger cars increased more than one-fourth in number and value, while motor trucks increased one-fifth in number and more than one-third in value. Parts of cars and trucks, exclusive of engines and tires, show a slight increase and exports of motorcycles were three-fourths larger than in November. Automotive exports as a whole show an increased value of nearly one-fifth over November.

Actual figures for December are: Passenger cars complete, 1784; value \$1,709,264; chassis, 862; value, \$646,018; motor trucks, complete, 161; value, \$178,595; chassis, 350; value, \$322,191; parts of trucks and cars, value, \$2,688,850; motorcycles, 868; value, \$250,457; airplanes, four; value, \$35,000; airplane part, value, \$1480.

NEILL PROMOTED.

PHILADELPHIA, PA., Feb. 14.—H. A. Neill, for the last five years manager of the Philadelphia branch of the General Motors Truck Co., has been transferred from this position to the factory sales staff.

Mr. Neill's promotion follows a long connection with the General Motors Truck Co. Before he was assigned to the Philadelphia branch he was special sales representative in several other territories and for a time was manager of the factory branch at Kansas City. In his new capacity at the factory Mr. Neill will be assigned to special work among the branches and distributors of the company.

Akron Franchise Issue Hinges on Bus Operation Laws

Officials of Traction Company Say Lower Car Fare Might Result from Restriction of Many Jitneys That Have Demoralized Street Railway.

AKRON, O., Feb. 14.—When negotiations between the city council and the Northern Ohio Traction & Light Co. are resumed shortly, relative to a new permanent franchise for operation of the Akron city car line system, the matter of jitney service is expected to play an important part in whatever amicable settlement is reached.

It is considered probable that the N. O. T., in seeking a service-at-cost franchise with the city, will endeavor to have incorporated in the franchise ordinance some sort of provision which will restrict, or at least regulate, jitney operation in the city. Recently the traction company, in reporting a deficit in operating expenses of more than \$11,000 for one month, stated that in order to break even it would have to carry 10,000 more passengers a day.

A check by the traction company shows that jitneys and busses are carrying an average of 20,000 passengers daily. This, according to N. O. T. officials, means that in a year's time jitneys and busses in competition with the street cars take from \$350,000 to \$375,000 in revenue away from the N. O. T., or an average of \$1000 a day.

If jitney service could be cut in two, it is pointed out, this would mean approximately 10,000 more passengers a day for the N. O. T., which would enable it to break even on operating expenses based upon present service.

Last year there were 589 jitneys and busses in operation in Akron as compared with 489 in 1920.

The traction company has proposed to install busses as feeders to car lines, and to operate in lieu of permanent extensions, and has already ordered several busses for use here.

Officials of the company say that

should jitney and bus traffic here be regulated and reduced, a lower rate of car fare might be possible as gross revenue would be materially increased through heavier street car traffic. The N. O. T. is now operating under an emergency ordinance providing a flat five-cent car fare. The previous rate was six tickets for a quarter. Under a new franchise a sliding rate of fare would be sought, based upon the rate of return.

TRUCK AXIOMS.

AN OUNCE of attention is worth a pound of overhaul.

An oiling a day keeps the repair man away.

Look before you back.

Spare the oil and spoil the truck.

A rolling truck gathers no repair bill.

A tool in the kit is worth thousands in the garage.

Service is as service does.

Fools rush in where experts fear to ride.

A little knowledge of electrical systems is a dangerous thing.

An ounce of instruction may save a pound of repair.

A skid to the wise is sufficient.

BUS SERVICE IN LONDON.

An interesting history of London's omnibus system is contained in Timken's magazine. According to the article the first busses were introduced on July 4, 1829, by George Shillibeer. His first route was from "The Yorkshirt Stinge," Paddington, to the bank, via Marylebone, Easton and Pentonville roads.

There were two busses and the fare was one shilling; half way, six pence. Newspaper and magazines were supplied free of charge. The vehicles carried 22 inside passengers and were drawn by three horses abreast and each bus made 12 trips a day.

Later Shillibeer's brother-in-law started some busses known as Caledonians, which ran along the road of that name. These became, many years later, the property of Mr. Wilson of Islington, whose "Favorites," together with the "Royal Blues," were eventually acquired by L. G. O. C. The English title of the L. G. O. C. was registered in 1858 with a fleet of 600 horse busses. In 1860 there were 1200 busses operating in London, many owned by small proprietors.

Charles Dickens in his "Dictionary of London" (1881) gives a list of 165 horse bus routes operated by various proprietors. Records for the half year ending June, 1901, show that 101,000,000 passengers were carried by a fleet of 1373 busses and 16,700 horses.

Steam omnibuses invented by Walter Hancock of Stratford were operated in London in 1833. They were unreliable and, in consequence, lost public patronage. The Turnpike acts of 1840 finally compelled their withdrawal.

The amalgamation of the L. G. O. C. with the London Road Car Co. and the Vanguard Co., which in turn had already absorbed many smaller concerns, took place in 1908. Working arrangements were made with Messrs. Tilling Limited about the same period. The National Steam Car Co. commenced operations in London in 1909 and ceased in 1920 with a working arrangement dating from 1916.

The total number of passengers carried by the L. G. O. C. and allied companies, including the National Co. and Messrs. Tilling, since 1908, is as follows:

	Millions
1908 (estimated).....	300
1909	316
1910	377
1911	400

(Continued on Page 80.)

Special Taxation Hits Farm Market Hard

Hanch Urges More Thrift in Government and Repeal of Transportation Charge.

WASHINGTON, D. C., Feb. 14. —“Under the existing tax law the farmer is getting hit in two directions at once,” said C. C. Hanch, chairman of the taxation committee of the National Automobile Chamber of Commerce, at the meeting of the committee on agricultural credit and insurance of the national agricultural conference today.

The special war time taxes on particular industries such as carpets, trunks, lighting fixtures, certain classes of dry goods and motor vehicles, have unbalanced the normal relation of production and consumption, aggravating the upset condition of industry, and depressing the normal market for farm products.

In addition to this indirect harm the farmer suffers from a special charge on his particular form of transportation, the motor car and motor truck. The greater part of his travel is over the highways. Even on his way to a railroad journey he needs the motor vehicle to get him to the station.

More thrift in government, Mr. Hanch contended, would make it possible to remove the special burdens falling on a few industries which also pay the usual taxes levied on business in general. The removal of these abnormal penalties on few businesses will materially help to restore the economic balance and be a decided move toward business recovery.

“About 3,000,000 motor vehicles are owned and operated by the farmers of the United States,” said Mr. Hanch. “The excise tax levied against the motor vehicle is passed along and paid by those farmers whose operating costs are thus increased. Furthermore, the tax on the rubber and repair parts of the motor vehicle is a penalty charged to the misfortune of the owner, the

only tax of its kind levied in the United States today.

“No one today will deny the utility of the motor vehicle. In a word, it is simply transportation, and just as a charge against freight and passenger travel on the railway was a charge reflected directly in the loss of profits of every farmer in the country, so does the charge against the motor vehicle affect the farmer and in even larger proportion, since

TOWS 46-TON LOAD.

AN UNUSUAL haulage feat in Omaha, Neb., recently tested the ability of the Pierce-Arrow dual-valve type of truck, says R. O. Patten, truck sales manager of the company. It seems that one J. J. Hanighen frequently calls upon F. L. Busche, haulage contractor of Omaha, to move an excavating machine which weighs 46 tons. On the most recent occasion Mr. Busche decided to test the power of his new five-ton dual-valve Pierce-Arrow.

Working alone the dual-valve unit towed the 46-ton apparatus a distance of five miles. The truck, with its enormous load, even climbed the seven per cent. grade at 30th and Harney streets without assistance, says Mr. Patten.

large quantities of his produce are carried on the highways which never reach the railways, while none may be said to go direct to the railway without travelling on the highway.

“The repeal of excise taxes on motor vehicles is just as essential as was the repeal of the tax on freight and passenger service.

BUS WINS OUT.

DETROIT, Feb. 13.—The K. L. S. C. Railroad, unable to compete with the motor bus lines operated out of Hartford to Kalamazoo, has taken off an extra train leaving but one passenger train daily to handle the traffic between Kalamazoo and South Haven.

Hard to Obtain Road Data from States

Bureau Public Roads, U. S. Department of Agriculture Reports Information Scarce.

WASHINGTON, D. C., Feb. 14. —With the annual expenditure for roads and streets in the United States approaching the billion dollar mark, more accurate information and better means for obtaining it seem necessary, says the bureau of public roads of the United States Department of Agriculture. One thing very much needed is the concentration of all sorts of information and statistics concerning the roads of the various states in the state highway departments.

Engineers of the department are now gathering complete information regarding the road mileage and expenditures in the United States. In many of the states much of the information desired is easily obtainable from the state highway department. In the case of Iowa the figures were obtained almost immediately. In other cases it has been necessary to send out numerous questionnaires and sometimes the information has been obtained only after personal visits. In one state 1800 questionnaires had to be sent out to bring in the needed figures, and in some it has been found that practically no records have been kept. For some of the counties in New Mexico questionnaires had to be translated into Spanish before the road officials could understand them.

TAKES CHICAGO BRANCH.

WALPOLE, MASS., Feb. 12.—Announcement is made that Andrew Scharff has been appointed Chicago branch manager for the Multibestos Co., manufacturer of Multibestos brake lining and Multibestos clutch lining. Mr. Scharff was formerly Minneapolis district manager for the Multibestos Co. and has had a widely varied experience in his own particular line.

Wayne Oil Co. Buys Borromite Plant

New Owner Will Enlarge Works Says W. M. Griffin—Also Absorbs Warriner Co.

FORT WAYNE, IND., Feb. 14.—The Wayne Oil Tank and Pump Co. today through the purchase of the Borromite Co. of America, Chicago, for \$500,000, has added to its holdings. William M. Griffin, president of the company, made this announcement today after the half million dollar transaction had been fully consummated.

Immediate enlargement of the factory facilities of the Wayne Oil Tank and Pump Co.; erection of an experimental laboratory; absorption of the Warriner Manufacturing Co., organized here a year ago; centering of control of the zeolite mines of New Jersey in the Fort Wayne company; and establishing this city as a leader in another important industry are among the principal effects of the half-million dollar transaction.

"The purchase has been fully accomplished for \$500,000," said Mr. Griffin today, in disclosing the transaction. "By it, the Wayne Oil Tank and Pump Co. becomes the unqualified owner of the Barromite Co. of America.

The directors of the Wayne Oil Tank and Pump Co. were known to be considering the purchase and removal to this city of the Borromite company 10 days ago, but it was not until this afternoon that official announcement of the transaction could be induced.

As soon as possible the machinery and equipment of the Chicago company will be moved to Fort Wayne. Mr. Griffin stated that factory buildings will be erected upon the 17-acre tract owned by the Wayne Oil Tank and Pump Co., Canal street and the N. Y. C. & St. L. railway, to house the new industry. One of these will be designed for the refining of zeolite, a mineral necessary in the water softening process and which will be obtained from mines

WANT BUS BOND ISSUE.

ALBANY, Feb. 10.—A bill designed to give New York City unlimited authority to issue bonds for the purchase of motor busses has been introduced to the state legislature by Senator Downing of New York. Already an initial expenditure of \$25,000,000 has been approved and appropriated by the board of estimates and apportionments.

in New Jersey now owned by the Wayne Oil Tank and Pump Co.

Control of the largest and most readily accessible beds of zeolite as one of the most important factors gained by purchase of the Borromite company. Zeolite is a hydrous silicate, in composition analogous to feldspar, its chief metals being aluminum, sodium, potassium and calcium. It is absolutely essential in the operation of water softening plants, according to Mr. Griffin's statement. Zeolite mines are few in the United States and none are as easily accessible as those in New Jersey, owned and controlled exclusively by the Wayne Oil Tank and Pump Co. by virtue of its current purchase.

MENOMINEE TRUCK CUTS.

CLINTONVILLE, WIS., Feb. 14.—Price reductions on the various models made by the Menominee Motor Truck Co. are as follows:

	Old Price	New Price
Model "HT" 1½-ton truck..	\$2080	\$2000
Model "H" 1½-ton truck...	2725	2475
Model "D" 2-ton truck....	3245	2875
Model "G" 3½-ton truck..	4270	3800
Model "J-3" 5-ton truck....	5450	4850

BUYS BUSSES.

ROCKFORD, ILL., Feb. 13.—The Fay Motor Bus Co., which recently lost a fight for the exclusive right to operate motor busses in this city, is to be organized. The Rockford Street Railway Company has received two large motor busses and will purchase eight more.

General Motors Has Special Motorbus

Details of Newest GMC Product Show Marked Difference from Truck Design.

PONTIAC, MICH., Feb. 14.—The General Motors Truck Co., builder of GMC motor trucks, will enter the motorbus field soon with a specially designed and built motorbus it is stated.

Announcement of this new model has just been made by the factory at Pontiac and the details of the bus will be made public within a couple of weeks. The new model is the result of several months investigation and experiment by the GMC engineering and sales staffs.

At present there are a large number of GMC truck chassis being used in motorbus work which are said to perform satisfactorily. However, to make certain that every phase of this new and rapidly growing business was covered, the GMC engineers, it is stated, have evolved this new model, designed and built not as a motor truck chassis, but as a motor bus.

A number of large bus owners in the country who have seen this new motorbus and ridden in it say that it fills requirements.

(Continued from Page 78.)

1912	551
1913	736
1914 (war period).....	757
1915 (war period).....	689
1916 (war period).....	721
1917 (war period).....	654
1918 (war period).....	682
1919	860
1920	936

The average mileage operated by a bus per day is 120 miles. This is worked by two shifts of men, driver and conductor. The maximum mileage scheduled for a bus to work during the day occurred during the war, when one of the services catering for the munition workers in the Woolwich area necessitated a daily journey of 180 miles per bus.

Seek Elimination of Grade Crossings

Federal Aid Highway Officials Will Make Every Effort to Safeguard Roads.

WASHINGTON, D. C., Feb. 15.—The grade crossing must go and will be eliminated wherever possible on the roads of the Federal Aid Highway System, which will be built as a result of the passage of the federal highway act. When the roads which form the primary, or interstate system are constructed, no grade crossing will be allowed to remain that it is at all practicable to avoid. Every effort will be made to make the roads of the secondary system equally safe, but in this case it is recognized that elimination may not be practicable in all cases at this time.

In making this announcement the bureau of public roads, United States Department of Agriculture, under whose supervision the fund is allotted and construction is undertaken, is putting into effect a policy which it has long advocated in principle, the adoption of which it has urged with increasing effectiveness upon state highway officials for some time past. The policy is meeting with hearty cooperation on the part of the states, and the American Association of State Highway Officials by resolution has pledged its best efforts to cooperate to eliminate grade crossings on new construction.

In addition the policy finds favor among the railroads, some of the leading carriers already having lent cheerful aid in avoiding the construction of more grade crossings.

In the future there will be constructed, wherever possible, either a bridge or an underpass where roadway and railway intersect. Important roads, which now cross and recross railroad lines at grades hereafter will be located entirely on one side of the railroad, even though to do so may increase the cost of construction. State officials, realizing the need of eliminating grade cross-

ings, have stated their desire to cooperate with the department in carrying out this plan.

Where crossings are unavoidable, or where local interests justify construction of highways to cross railroad lines, the road will be so located as to pass over the track or under it. In most instances of this sort the railroads bear one-half of the cost of building the bridge or underpass.

The prime object of the department's policy to eliminate grade crossings on federal aid roads is the saving of human lives. This policy probably will involve increased expense of construction in the case of some roads, but it is believed this is justified by the saving of life. During the three years ending with 1920, according to the best records available to the department, 3636 lives were lost at grade crossings in the United States and 10,644 persons were injured.

BUSSES FOR YOSEMITE.

The Yosemite National Park Co., it is announced, will get the first six new White bus chassis to be delivered on the Pacific coast. With this addition its fleet will total 51 Whites in the Yosemite Valley stage line.

BUS CO. BUYS PROPERTY.

DANVILLE, ILL., Feb. 13.—The Danville Motor Bus Co. has just been given a long time lease on the McLellan livery property and will open a waiting room, passenger and freight station, in addition to which a garage for the repair and storage of motor busses and trucks will be provided. W. B. Lidke, secretary and treasurer of the newly organized company, has purchased six busses, and 17 more will be added in the near future. The company plans to handle passenger traffic in every town and village in Vermillion county, with headquarters at Danville as noted.

Plan Standardization of Truck Cabs

Motor Truck Manufacturers' Committee of Society of Automotive Engineers Consider Matter.

NEW YORK, Feb. 15.—Owing to the large number of purposes for which motor trucks are used, it is the universal practise of all truck builders to sell motor trucks without bodies or cabs, these units being obtained by chassis purchaser. As bodies and cabs are not interchangeable on different makes of truck of the same capacity, it is necessary for motor truck chassis buyers to place special orders for bodies and cabs, these units being fitted to the truck at the body builders' plant, resulting in additional expense and a loss of time.

Motor truck users and body and cab manufacturers fully appreciate this most uneconomical situation, but as the quantity production of bodies and cabs is absolutely impossible owing to the variation in the dimensions for the different types and makes of motor truck chassis, they are powerless to remedy the situation.

At the suggestion of a truck manufacturer having a large distributor and dealer organization, this condition is to be discussed by the Motor Truck Manufacturers' committee of the Society of Automotive Engineers' Standards' committee.

The fundamental dimensions which must be standardized to obtain the desired interchangeability of cabs are the distance from the windshield to the front of the driver's seat and the width of the seat. The latter dimension has been standardized at about 20 inches in practise, but the former varies depending principally upon the angle of the steering column.

It will probably be found necessary to establish two cab widths or seat lengths owing to the larger crew usually carried on the heavier trucks and also to appearance. Instruments will be attached to a dash furnished with the chassis.

The Transportation Problem

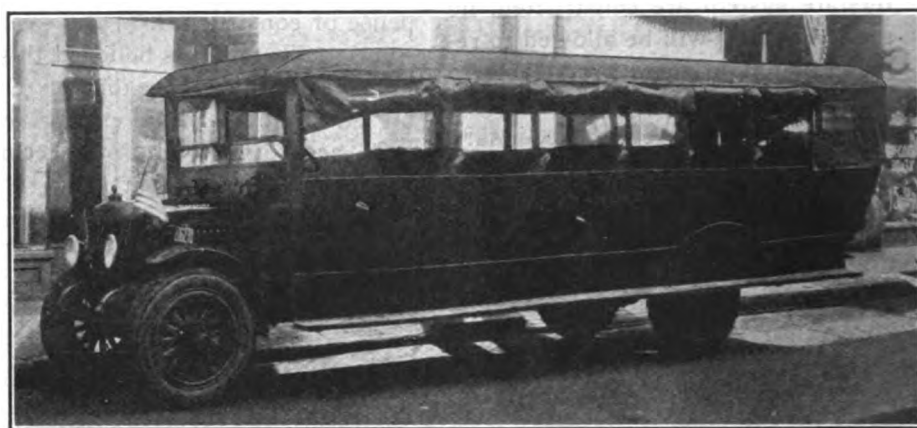
Requirements of Present Age More Exacting Than Ever Before—Distinct Public Demand for Better Service Says Transport Headlight.

CERTAINLY one of the most vital influences on the industrial and social life of any country is passenger transportation. So important is it, in fact, that to a great extent prosperity and general advancement depend upon the adequacy of facilities for meeting public needs in this line. And naturally, the requirements of the present age are more exacting than ever before. The world-wide tendency to constantly

speed up has made time a factor of tremendous importance and marked improvement in transportation has accordingly been necessary. To gain some idea of the remarkable transformation in this line the past century, we have but to compare the lumbering stage coach of yesterday with the present greatly advanced mediums of travel with which we are all familiar.

AND yet there is no denying the fact that transportation the country over is even now unequal to the stupendous task confronting it. One does not have to travel extensively to have this fact brought sharply to his attention. Time and again we find it necessary in going from one city to another to travel twice the actual distance between the two points and consume two or three more hours than should be needed in making the trip, due to the lack of direct railway connections and the consequent necessity of taking a roundabout course. We are also quite familiar with the difficulties experienced by the city trolley systems in taking care of crowds during rush hours.

There is a distinct public demand for facilities that will take up this slack in transportation, in the fulfilling of which mission the motor



Large Bus Mounted on 2½-Ton Transport Chassis. Note Long Wheelbase.

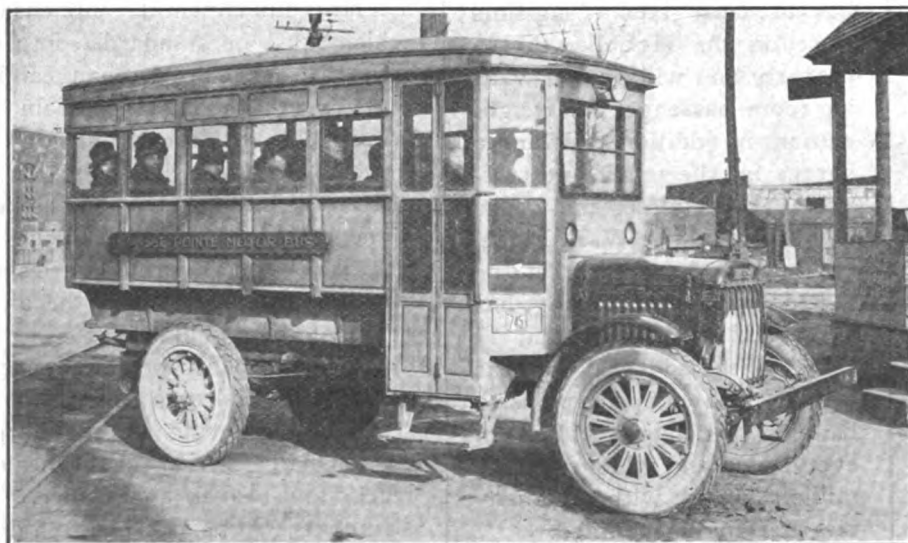
bus is coming rapidly to the front. And unquestionably this equipment represents the logical solution, as it supplies the missing link in the chain. Wherever there is a street or highway open to traffic, the bus can go. It takes the short route between all points, thus saving time and money for the traveller and add-

ing greatly to his comfort and convenience.

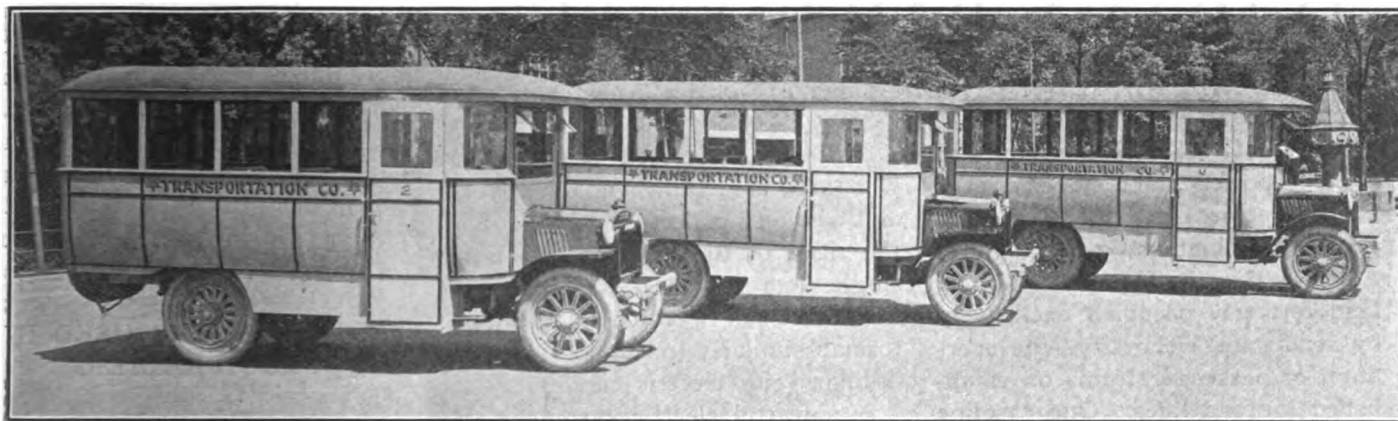
As a business the operation of bus lines is proving thoroughly profitable, and the best possible evidence that they are effectively meeting a real need is found in their constantly increasing number. Making a strong appeal to business men is the fact that it is unnecessary to tie up a lot of money in purchase and maintenance of steel rail equipment.

The widespread movement to consolidate rural schools has also contributed materially to the fertility of the motor bus market. The number of consolidated schools now in operation is estimated at 14,000, with 4000 more in immediate prospect or during the year.

And so completely has the motor bus demonstrated its superiority over horse-drawn vehicles for this service that it is becoming everywhere recognized as the standard transportation medium where consolidation is in effect.—Transport Headlight.



Low Step and Easily Operated Door Feature This Transport 1½-Tonner.



Three of the Six Denbys Owned by Star Transportation Co., Mason City, Ia., Which Are Pleasing Patrons.

Competes with Railroad

Mason City, Ia., Bus Operator Finds No
Difficulty in Maintaining Regular
Schedule on 52 Mile Route.

(By EARLE T. SUTTON, Advertising Manager, Denby Motor Truck Co.)

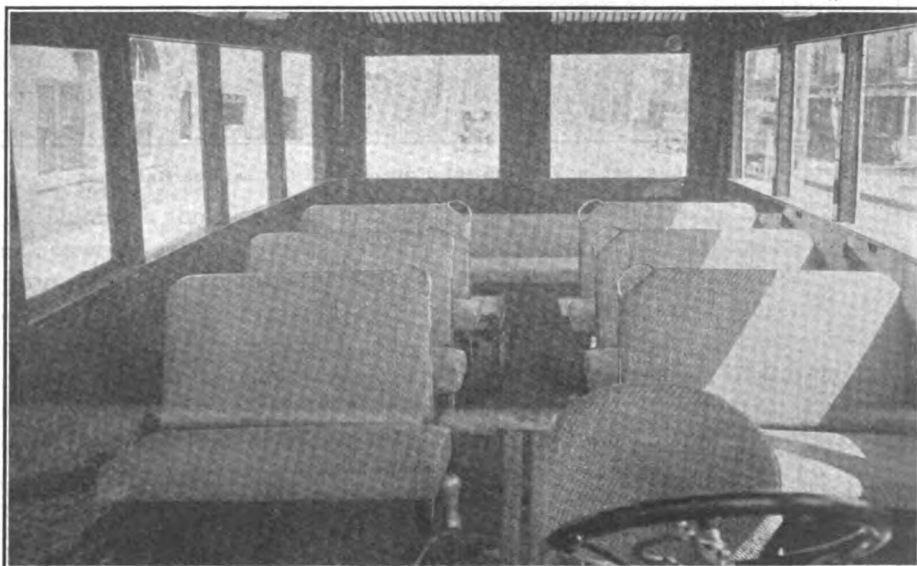
TO WHAT extent the motor bus is tying into the business of the railroad is not at this time authoritatively known. There are distinct shining examples all over the country of installations of bus lines that are profitably serving large communities satisfactorily. The Star Transportation Co. of Mason City, Ia., is operating three model 33 1½-2-ton Denby busses with great success. Regular service is maintained between Garner and Charles City, Ia., via Mason City, a distance of 52 miles, with a running time of two hours, 45 minutes, making 10 stops en route. Train connections are considered in the schedule, and reports show a very satisfactory service for patrons. Five operators are used, and definite instructions regarding operation of busses to insure safety for passengers are rigidly enforced.

THE bus bodies used on the Denby chassis were made by Miscampbell Co. of Duluth, Minn., and are unique in construction and appearance. They are of rattan finish, with drop windows, and entrance at right of driver's seat controlled by him. They seat 20 people, and during rush hours are carrying as high as 30. Each bus carries advertising space for 20 cards, street car style. Electric lights are furnished from ceiling dome lights. Special lockers carry tools and extra equipment and spare tire carrier is attached at the rear of the chassis; 35x5 front and 38x7 rear pneumatic tires are used, insuring extraordinary comfort to the passengers. Each bus operator has before him definite orders regarding his particular run, as to road conditions, rough spots, detours and speeds at which to operate at certain locations. He likewise has information to show him exactly where the other

busses are at any time, in order to facilitate transfer and aid, if needed.

An extract from a report written by one of the officials of the Star Transportation Co. to the Denby Motor Truck Co. quote as follows: "The trucks are doing wonderfully

well. The propellor shaft brake makes a lot of difference in wet weather—no skidding—and we handle as high as 30 passengers per bus. Gasoline consumption runs as high as 14 miles to the gallon," depending, of course, on conditions."



Carefully Designed Interior Arrangements Enhance Comfort of the Passengers.

INDIANA RAILWAY BUS

(By E. A. KIGHTLINGER, Sales Manager Indiana Truck Corp.)

GASOLINE — the motive power which moves a large percentage of the world's goods, and half the population of America, has now entered a new field formerly occupied exclusively by steam and electricity—the operation of passenger trains on established railroad lines. One gasoline railway bus that attracts favorable attention is in effect a converted motor truck, built by the Indiana Truck Corporation of Marion, Ind.

THE wheelbase of this bus is 180 inches and the body is considerably longer. The conventional motor truck wheels have been replaced by a special four-wheel pony truck in front and extra heavy wheels with steel flanges like the wheels of a locomotive in the rear. In front of the radiator, which is of the regular truck type, is a conventional pilot, which gives the standard railway appearance, and provides safety for the car and its passengers.

Mechanically the chassis is practically identical with the regular In-

The car is operated by one man who acts as motorman, or driver, and who also collects the fares. To the right of the driver's seat is a single door for both entrance and exit, which is operated by the motorman similarly to the doors on an ordinary city electric car.

A powerful electric system is an integral part of the car. This provides current for starting the motor, lighting the passenger compartment and the powerful head light.

When the gasoline bus car was first completed by the Indiana Truck Corporation a number of prominent railroad officials made the maiden trip in it. In their opinion this new car fills a long-felt want for railroads which are not being operated profitably or where electric power is not available.

The Indiana gasoline bus car is a pronounced contribution to the present problems of the railway. It represents a comparatively low initial investment, its operating expenses are low and it opens up a new phase of railroading—the short passenger haul in districts where

of the rail transportation system of the country. It takes care of the unprofitable and unsatisfactory short line for the railroad. With the entrance of the motor truck adapted to its new use in the passenger field, another one of the pressing railway problems is successfully solved.

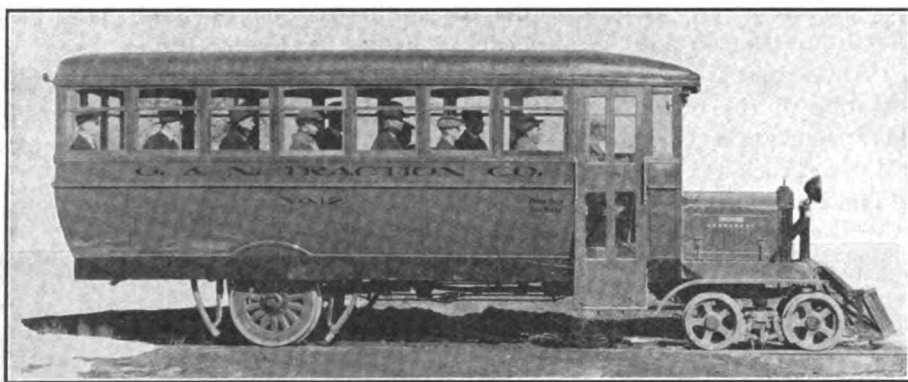
MOTOR TRUCKS USED IN FLOOD RELIEF.

Motor trucks as an emergency transportation method proved their availability in southern California during the recent period of heavy rains. Relief supplies to many parts of the surrounding country were rushed by truck when all other methods of transportation failed. In fighting flood waters trucks were found especially valuable in hauling sacked sand, brush and debris of all kinds to points in flood control levees which were about to break. Trucks also were used extensively in taking crews of laborers from place to place.

"The mobility of the truck as a transportation unit again proved one of the chief assets in combatting the floods," stated an official of the Mack-International Motor Truck Corporation, distributor for Mack trucks. "The railroads did their best under the circumstances, but were restricted to a fixed right of way. If the danger zone could be reached by rail, excellent relief work was done, but when a bridge was out or the road bed was regarded as treacherous, progress stopped. Several owners of Mack trucks were engaged in carrying emergency supplies and they had various exciting experiences.

"The chief factor in favor of the trucks was shown as when one road was blocked or one bridge was out there remained other avenues of approach and these the trucks located and the purpose was accomplished when all other agencies failed."

The efficiency of the motor truck is unquestioned. Many examples such as the foregoing attest to its faithful performance, and there is no one who is acquainted with the facts that doubts this truth.

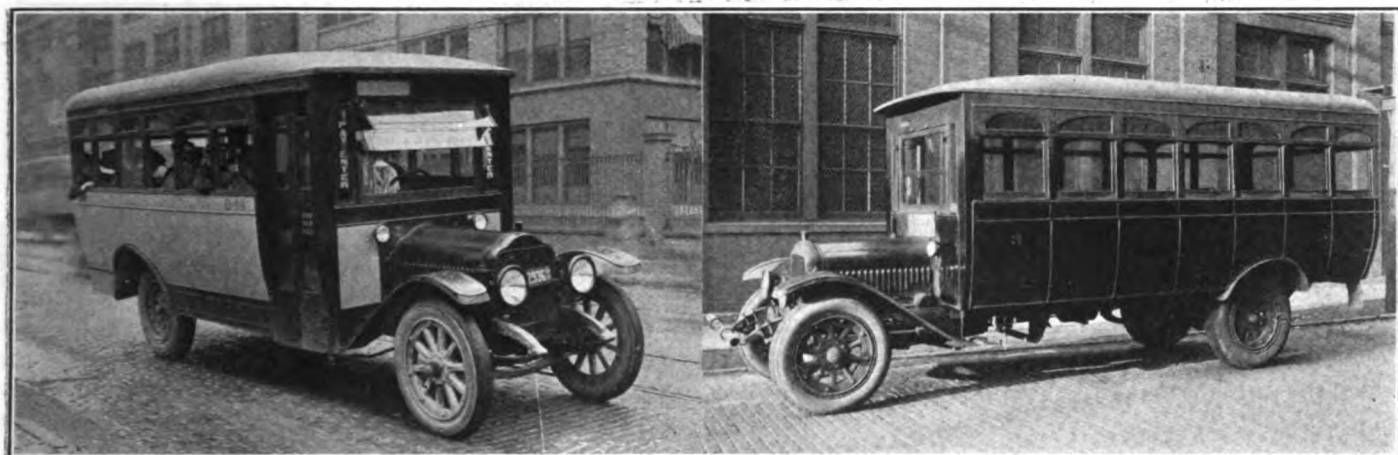


Railroad Officials See a Substantial Future for the Gasoline Rail Bus.

diana truck chassis with such changes as are necessary to adapt it to the requirements of rail service. The four-speed transmission provides for easy starting and stopping and permits of a higher sustained speed on the rails. In the initial run a speed of 41 miles an hour was attained on the straight away and the passengers reported the car as very comfortable and steady at even that high speed.

electric power is not available, and where steam motive power and equipment cannot be used profitably. This car will be operated between Gallipolis, O., and Parkersburg, W. Va., and will be watched with much interest by everyone who is interested in railroads.

The motor truck is already moving a large amount of freight tonnage of America. The motor truck is now known as the able assistant



Goodyear Tire & Rubber Co. Officials Have Played an Important Part in the Development of the Bus in Akron.

Bus Makes Good in Akron

"Rubber City", One of First to Adopt Vehicle, Has Developed It to Point Where Success as Common Carrier Is Unquestioned

(By H. HARLAND HARRIMAN.)

THE automobile bus as a common carrier—as an instrument for cheap, yet efficient passenger transportation, has proved itself in Akron, O., the city noted as the rubber manufacturing center of the world.

It is not strange that Akron is one of the first cities where the bus carrier has grown from the experimental to the practical stage, for it was in Akron that pneu-

matic tires were first extensively built and used and the pneumatic auto tire has been one of the chief factors in the success of the motor bus as a physical transportation medium. Also the city presented conditions ideal for rapid development of the bus as a passenger carrier. The conditions were such as to encourage persons interested in the motor bus theory to fight the many obstacles present in every varying degree.

SO IT may safely be said the motor passenger bus has been given a fair trial in Akron since details of the problem have been met and worked out.

Today there are 40 large motor busses, built and especially equipped to carry passengers, operating on specified routes and regular schedules within the city. Thirty-eight other busses make scheduled runs between Akron's business district and suburban villages and surrounding towns. Thus a rapidly growing web of motor bus lines covers the city and outlying points.

Experiments with the motor bus have covered a period of seven years. But it has been during the last three years that hundreds of housewives have thought only of the word "bus" when they prepared to go down town shopping, or the man with his lunch basket felt for

his cash bus fare, instead of a street car ticket.

There are nine bus routes lying within the city and each of these has a down-town terminal point. Thirty-eight large motor busses cover these routes and 25 miles of city streets. Good transportation is afforded to more than 30,000 people.

Eleven routes begin in the center of the down-town business district and extend beyond the city limits to suburban points. The longest of these suburban lines are the two between Akron and Cleveland, each covering an approximate distance of 30 miles.

Thus there are 20 bus lines covering a total of more than 200 miles of city streets and highways.

It was during the year 1915 when Akron industries were beginning to feel the war boom which increased the population more than 100,000 that the motor bus ventures began.

A street car system comprising, in the main, nine long routes, proved



Showing Position of Fare Box on Type of Bus Much Used by Operators of One-Man Busses in Use in Akron.

to be almost helpless in meeting the enlarged transportation situation. Real estate sub-divisions were ex-

ploited right and left and outlying fields soon became allotments rapidly being dotted with new houses to meet the alarming housing shortage.

In four years residential extensions reached undreamed of proportions and swelled the city on all sides far beyond the reach of street railway lines to which no extensions were made. The situation was such as to force some remedy.

Then came the motor bus which seemed the only means of temporary relief.

Much of the credit for the creation of the motor bus carrier as it is today must be given the Goodyear Tire and Rubber Co. The great Goodyear factories lie in the east section of Akron a mile and one-half from down-town and the topography of the city resulting from its peculiar growth made it impossible to reach East Akron except by two thoroughfares and two street car lines.

The Goodyear company found its war business increasing until more than 25,000 employees were working on three daily shifts. In order to retain their employees and provide for them a satisfactory living condition, the company opened a large real estate allotment which began near the factory and reached out over the hills of East Akron beyond what had been the city limits. The section was rapidly improved, hundreds of modern homes were built and the properties sold to Goodyear workers. So, seemingly almost overnight, a brand new wing of a large city sprung into being.

"We must get our workers to the factory, economically and efficiently," Goodyear officials reasoned and so they turned to the motor bus. Experiments proved the five-ton truck engine and a two-ton truck chassis mounted on pneumatic tires to be the most advantageous combination and this type was used extensively.

Several such busses were commissioned and routed through the new Goodyear Heights. The line became an auxiliary to the street car system since it was tangent and not parallel to any of the street railway lines. Since the system was not in any way a competitor of street car,

BRAKE ADJUSTMENTS.

USUALLY there is a turn-buckle, a clevis arrangement of V nuts for taking up the brake pull rods. These parts if allowed to collect mud and dirt on the threads soon get "set" in place, and when the time comes to make an adjustment quickly, it is found that it cannot be done. If the driver would go over the machine and scrape away the mud from important parts he would save much time and labor later.

its success is worthy of note to those who seek the bus as a solution of the passenger transportation problem.

The original equipment, however, was a three-ton solid tire truck with a five-ton engine, the body being a double deck bus with a seating capacity of 35 persons. At this time the bus operations were not considered a distinct business enterprise, but merely a necessary auxiliary to the proper development of the real estate sub-division. A three-cent fare was charged and it was intended the bus should be self-sustaining, but few accurate records of the operation were kept.

The busses were operated on a regular schedule and two shifts of drivers. The crew of each bus consisted of a driver and a collector. With the establishment of the bus lines the demand for property in the Heights grew rapidly and under the new demands an advanced type of bus was adopted.

In the spring of 1916 the double-deck bus gave way to the single-deck bus with cushion tires. The body was an enclosed type and it had an economic advantage in that the operating crew was reduced to one man and a service advantage in the better riding qualities of the cushion tires.

The development of the bus system and of the housing project soon reached a point where each was absolutely inter-dependent on the other. The following year the sys-

tem was placed in the charge of one man and was operated as an independent concern. Gradual increases in fare were made until the rate was five cents per trip, which is now the price per person.

Ten busses are now on the Heights' routes and carefully kept cost figures show the system has become increasingly profitable.

White motors are used in all the busses and the bodies are a standard design. The latest bus models seat 25 passengers and are entirely enclosed, with windows on all sides. They are equipped with rattan fiber seats, floor heaters and stop signal buttons at every seat. They are of the "pay-as-you-enter" and the driver sits behind a rail which protects him from the moving passengers. The single entrance and exit door is operated by a balanced lever near the driver's seat. The two steps in the door are lowered to make it but a short step to the curb. Tires used on the busses are 40 inches by eight inches on the rear and 37 inches by five inches on the front.

Since the boom time passed and during the recent industrial slump, traffic may be said to have reached a normal or average rate. On this basis slightly more than 140,000 passengers are carried per month.

During the morning and evening hours of the day when peak loads are being carried, busses run out and back over the same streets. At night the busses are routed from the bus station over one set of streets and return by another.

It has been found the two-ton chassis is adequate to carry the necessary load. The five-ton motor has been found to be the best because of severe grades and it also has advantages in rapid start after each stop. With this power unit the busses are capable of 30 to 35 miles per hour where traffic conditions permit of operating at this speed.

Insurance has been used to cover public and passenger liability, but officials are considering the advisability of assuming the risk for the operators as is done by other pub-

(Continued on Page 100.)

Tests Stamina of Bus

Hilly Roads of Mining Country Negotiated
by Car with Specially Designed Acme Body
and Chassis—Beats Railroad Time.

IN NO field of motor truck operation is there more interest being shown at this time than in the field of passenger transportation by motor bus. Pick up any trade journal and you will invariably find some reference to this subject. Up around Duluth, Minn., in the mining country north and west of that lake port, the number of motor busses has been continually on the increase.

THE reason for this is that bus service on the highways between Duluth, Hibbing, Virginia, Twig and a score of other points is far ahead of the class of service accorded to residents of that district by the steam rail lines which serve this territory. Because of the hilly nature of the country the railroads follow a longer route, circling around the hills, whereas, the bus lines follow the more direct highway route which extends over the hills.

The many grades which the busses must negotiate on the route are perhaps as steep and as frequent as any found along a stretch of

highway of a similar length in the country. Yet despite the severe conditions of operation the bus service has been mentioned as universally excellent.

Perhaps no better records in this class of service have been established than those set up by the number of Acme busses operating in this mining country. Take the case of Matt Veale operating an Acme bus between Twig, Minn., and Duluth. Veale has a 1½-tonner No. 7274, which in two years of service has a record of over 30,000 miles travelled, the only repair expense during this time being two front springs, and the cost of grinding the valves once.

This truck has travelled daily ever since it was put into operation between Twig, Minn., and Duluth. It makes two trips daily, the distance between the two points being about 20 miles. It is usually loaded to capacity and sometimes the bus is so crowded that it has been necessary for people to stand on the running board. Mr. Veale cites one instance where he had such a big load on the bus that when it became

necessary for him to make a sharp turn he had to ask some of the passengers to climb off the running board and the front fenders to relieve the front wheels of enough weight to make it possible to turn the front wheels.

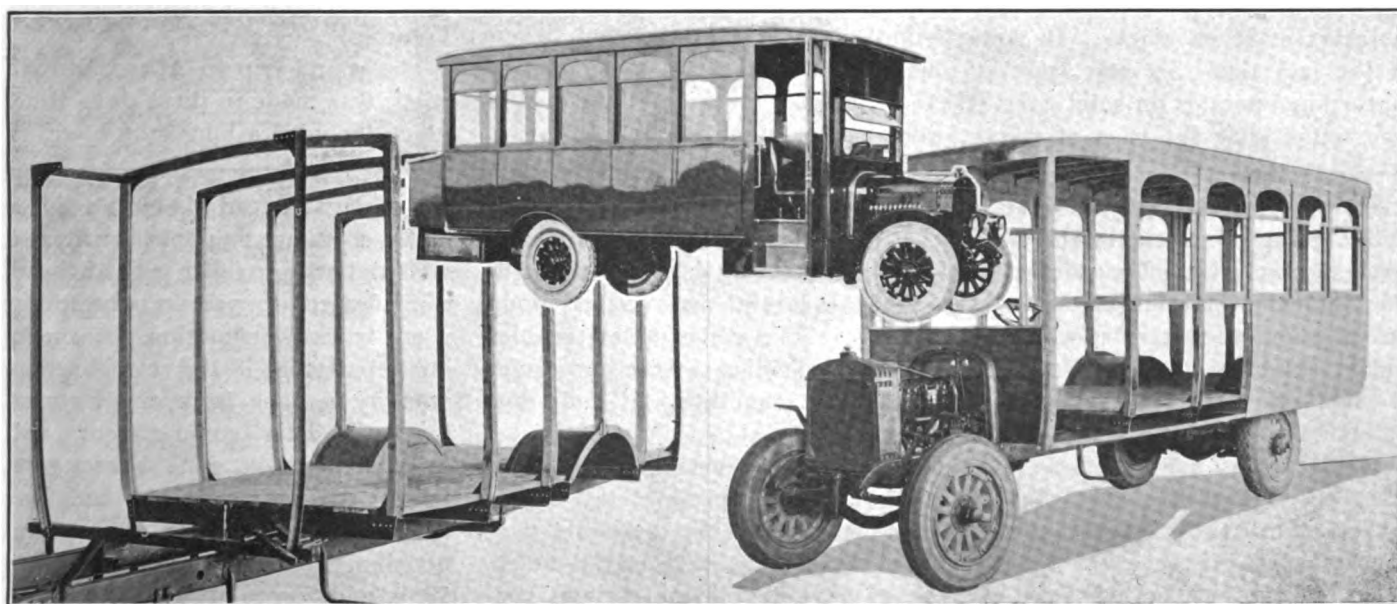
"I have never missed a trip because of bad roads," says Mr. Veale. "I have always been able to go straight through with my Acme."

"Last winter," says Mr. Veale, "I had an interesting experience while travelling with about 17 people on the bus. I came to a bad spot in the road. I made straight for the bad spot in the road and without a pause my Acme pulled straight through. I might say that during the winter of 1919 at a time when the snow was unusually deep between Duluth and Twig, I was always able to reach my destination with my Acme bus."

Mr. Veale cited many other interesting experiences with this Acme 1½-tonner. Needless to say he is very enthusiastic about its performance. How really satisfied he is with its service you may judge from the fact that several months ago a new Acme special AC 20-passenger bus job went into his service.

This big speed bus if anything is surpassing the record established by No. 7274. A few days ago it performed an acrobatic stunt that proved conclusively to Mr. Veale that Acme busses are quality built.

(Continued on Next Page.)



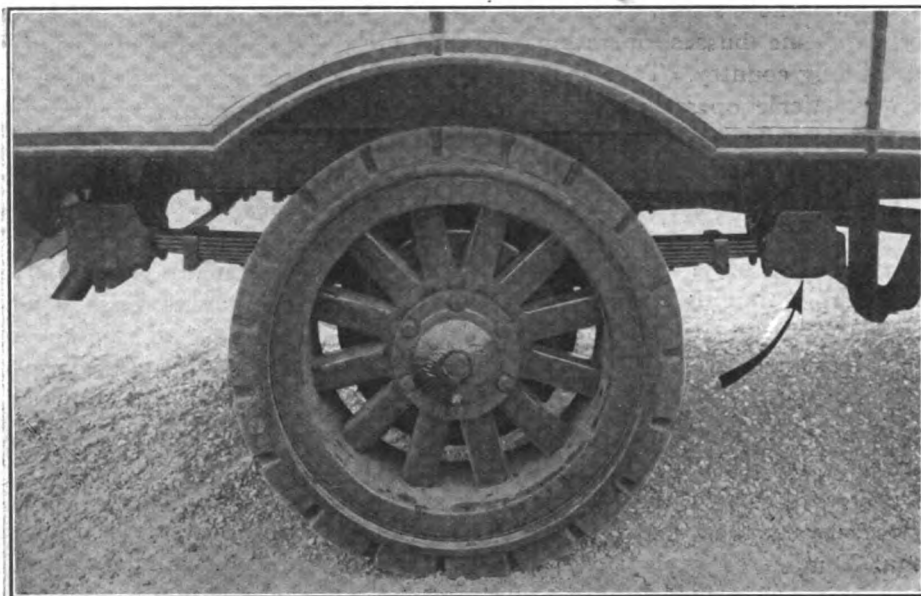
Frame Work of This Acme Body Is of Best Grade Steel. The Floor Is Oak, as Are the Upright Braces. Sides Are Made of Double-Ply Veneer Which Takes a Beautiful Finish and Stands the Strains of Rough Travel.

Suspension Unit Approved

Mack Shock Insulation Makes Long Trips a Pleasure
Is Verdict of S. A. E. Members Who Journey
by Bus to Southern State.

TWENTY-THREE members of the Society of Automotive Engineers recently took an unusual motor bus journey from New York City to Aberdeen, Md., at which place they were to witness an extensive demonstration of government ordnance material. Their purpose in going by motor bus instead of

by railroad was to satisfy themselves and to demonstrate to the country that passenger transportation over relatively long distances may be accomplished by this more flexible mode of transportation at a fraction of the cost of railroad travel, and with more opportunity to appreciate scenic features.



Arrow Points to Insulation Unit. Ends of Springs Are Carried in Heavy Moulded Rubber Block Rather Than in Ordinary Shackle. (See Text.)

THE bus selected for the test was one of the new shock-insulated busses designed and built by the International Motor Co., manufacturers of Mack trucks. In spite of the fact that this new type of motor bus operates on solid tires, it was found that the ease of riding

compared favorably to what is commonly experienced in the better types of touring cars. This unusual riding comfort is made possible by a simple, practical design that, when used with solid tires, tends almost to eliminate vibration. The whole idea is a patented method of spring

suspension constructed so that the ends of all springs are carried in a heavy moulded rubber block rather than in the ordinary spring shackle. This rubber shock insulator rests in a small cast steel housing which is riveted to the chassis frame. Two main spring leaves ride in a protracted slotted opening in the rubber block, thus increasing the strength of the spring while not reducing its resiliency.

Although functioning very similarly to a shock absorber of the cushion type, this device is of two-fold benefit for it takes the blow in compression whether the load is up or down, absorbing the rebound of the spring as well as the impact. The advantages of this double shock-absorbing feature were well demonstrated on the return trip from Aberdeen when a long detour over exceedingly rough roads was made between Philadelphia and Trenton.

The round trip to Aberdeen, 352 miles, was made in three days time, which included a long stop over.

(Continued from Preceding Page.)

While going down one of the steep streets in Duluth the bus skidded on the slippery pavement, left the street, plunged over an incline, and turning end over end in its flight, crashed against a large tree at the base of the hill. It seems remarkable, but it's a fact vouchsafed by Mr. Veale, that the only damage wrought by the accident was a cracked glass in the doors separating the two compartments.

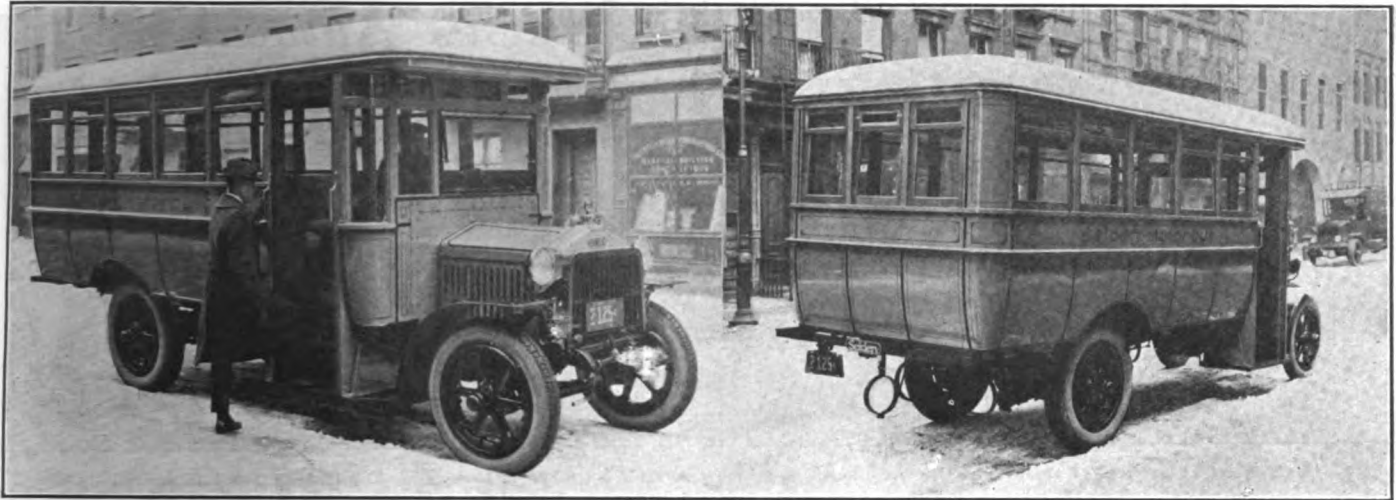
This body, built in the Acme body shop, is constructed on a steel

frame work. This steel frame, consisting of bottom channel iron and steel uprights, is designed to withstand all lateral and vertical body strains. This construction enables Acme bus bodies to stand up under the severe conditions of daily bus service.

Oak is used throughout on floors and wood supports. Sides are of moulded, double-ply haskelite veneer, which takes a beautiful finish. Seats have double coil springs, consisting of main and secondary coils, and all seat backs are furnished with

coil springs instead of being padded.

Windows are equipped with raise sash and are provided with anti-rattling devices to prevent drumming when truck is in motion. A smoking department in the rear is separated by a door from the forward section. This compartment will comfortably seat nine passengers, five in the wide rear seat and four in the two side seats over wheel housing. The forward section seats 12, in addition to an extra seat with driver. The door is operated by a lever from the driver's seat.



Type of Bus Used in Newark. All Busses Are Run Under a "Headway" System Organized by City Officials.

Has Increased 1300 Per Cent

Bus Business in Newark Characterized as
"Novel Innovation" Seven Years Ago
Shows Remarkable Development

(By GEORGE BANCROFT DUREN.)

CONTIGUOUS to a large suburban population, Newark, N. J., has developed a thriving jitney bus business which has increased in revenue and number of passengers approximately 1300 per cent. since this method of transportation was first undertaken as a "novel innovation" in 1915. At that time a few dilapidated touring cars, many of the "flivver" variety, plied their way over very uncertain courses, reaping a

yet more uncertain financial return for their trouble.

The world war bought a change. Thousands of workers swarmed to this city, factories on the vast meadow lands between Newark and New York City were working night and day shifts. Transportation mediums were at a premium. If the men and women were not carried to and from their places of business the wheels of industry would cease.

THE trolley system was not entirely adequate, for in many instances these factories (particularly the ship building plants at Port Newark) were not adjacent to any of the numerous trolley systems. From then on the jitney business began to develop. An appreciation of its growth may best be obtained by a comparison of figures.

Since 1916 the gross operating receipts of the jitney have increased from \$228,013 to an estimated total of \$2,500,000 for the present year. Similarly the total number of passengers has increased from 3,875,055 to the estimated figure for this year of 50,000,000. Thus as a result of this rapid expansion the city will receive in taxes a sum in excess of \$100,000, as compared to \$5556.92 taken in during the first six months of 1916, when a tax on jitneys was first collected. The city collects a

tax of five per cent. on the gross receipts of each bus.

Newark's peculiarly advantageous situation in the very heart of a vast suburban settlement is no doubt responsible in great measure for the success of the jitney business. Thousands of men and women employed in the city are transported daily by means of the jitney, for in many instances they travel through sections not readily accessible to the trolley lines. Some of the jitney lines in fact make trips of as great a distance as 10 miles. The jitneys recently have been doing a somewhat increased business due to the fact that the trolley system has inaugurated an eight-cent fare, which was apparently not generally appreciated by the riding public. Thus while the jitney drivers formerly experienced several dull hours during the day, they are now doing a "rush

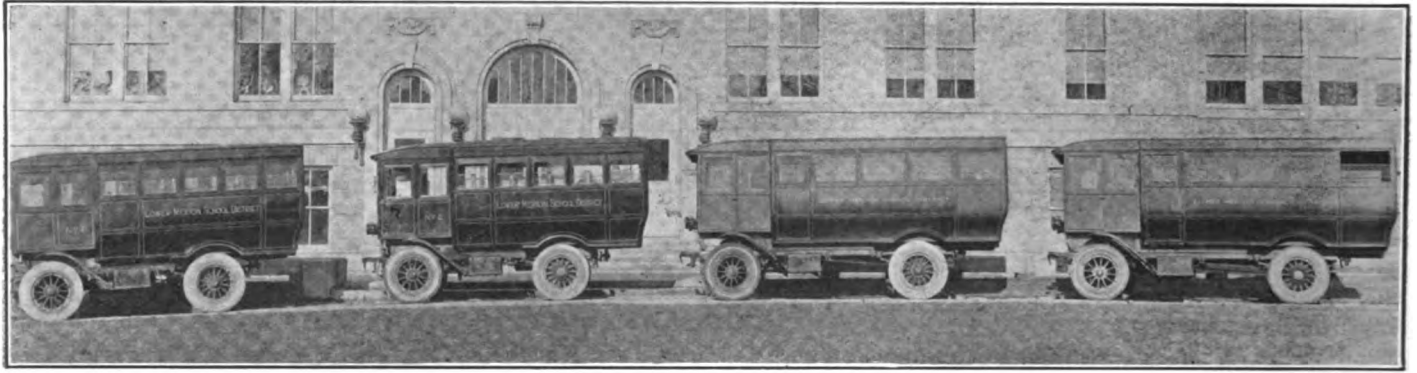
order" business at practically all hours, according to officials of the city department.

As previously mentioned it was in 1916 that the city first began to collect revenue from the bus drivers. The system before that time had been very irregular, busses had not been of a very appealing nature and there was much skepticism among those most closely connected with the transportation problem as to the success of the venture financially. For some while, in fact, the busses operated at a loss, or perhaps the luckier drivers just broke even in their receipts. The poor type of bus and the utter disregard of system no doubt was largely responsible for the rough places over which the jitney was first compelled to ride.

Now under the watchful eye of a

(Continued on Next Page.)

School Superintendent Praises Autocar



This Fleet of School Busses in Operation for Five Years, Has Gained an Envyable Reputation for Efficiency.

TO THE layman who has not followed closely the development of the motor bus as the chief factor in the centralizing of country schools, the appended statement of S. E. Downs, superintendent of Lower Merion school district, Montgomery county, Pa., that **busses have been used in Lower Merion county for five years in this work** will come as something of a revelation, this probably because little publicity has been given to the movement until the last year or two. Five years seems like a fairly long experimental period for any commodity—certainly the results speak well for the practical utility and

genuine efficiency of this form of transportation, the eventual effect of which cannot well be comprehended without careful thought.

Mr. Downs' statement follows: "The Lower Merion school district for five years has transported children by Autocar busses. We have discontinued all of our rural schools and have centralized them so that the smallest unit is now a school of five rooms. In addition to the hauling of elementary children to central buildings, we transport from all districts to a central high school; haul boys and girls from sixth, seventh and eighth grades to convenient centers for manual train-

ing and domestic science; make all necessary trips with athletic teams; deliver books and supplies and in many other ways secure for the children of our district all comforts and conveniences of those located in compact sections.

"During the past year these busses travelled slightly over 50,000 miles and in five years their total distance has approximated 200,000 miles. In all of this work there has been but one accident and that of a minor nature to one boy who tried to climb upon a bus while it was running. We could not if we would and we would not if we could return to the old types of schools."

(Continued from Preceding Page.)

special city department, the bus business is thriving. The rickety old "boats" of not so long ago have been supplanted almost in every instance by commodious busses costing in the neighborhood of \$7000 and carrying as many as 60 or 70 passengers. In fact the bus drivers are beginning to consider somewhat the safety and comfort of their passengers, with the result that the passengers are coming to look more favorably on them as a safe and rapid means of transportation. Of course there are careless drivers, but they are rapidly being weeded out. Better ventilating systems are being installed, the overcrowding evil is being fought (although perhaps not as successfully as might be hoped for) and a strict police surveillance of the drivers as to their speed and care in driving is rapidly whipping the system into shape.

When the jitney business was in its infancy in Newark there were numerous accidents, and in several cases busses upset with resultant death and severe injury to passengers. For a time people were wary of riding in them. But that was before the city's system began to function. Now the incautious driver has been practically eliminated, thanks to both the city officials and the State Department of Motor Vehicles which in Newark, as well as other cities, has stepped in on various occasions to lend a restraining hand. Accidents of a serious nature are now rare, with the result that more persons who previously refused to ride in jitneys, are accepting them as a logical and safe means of transportation.

To show the present operations of the jitney some additional figures had perhaps best be quoted. According to the city officials 5,651,069

passengers were carried on all lines during the month of November. This was the record month for all time. The gross receipts taken in by the owners during that period was \$282,553.45, while the city collected in fees \$11,137.17. The figures of the department further show that the average daily number of passengers in November was 188,702, whereas the daily average in October was 169,579.

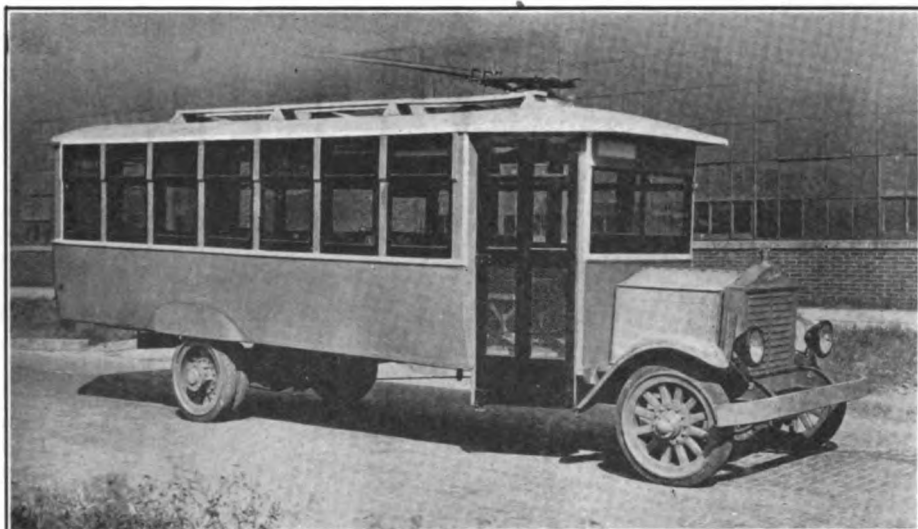
The city, since the inception of the bus, has been encouraging the use of the larger machines. According to reports the various drivers are favorable to this idea and are said to be selling their smaller machines for the larger type as rapidly as they are able. It is the plan of city to have the various lines painted a separate color. And at this point it may be of interest to describe briefly the system of running the busses over their various routes.

All the busses are run under a head-way system organized by the city department. Thus competition, which undoubtedly would result in racing among the drivers, is eliminated. It is contrary to a city ordinance for a bus driver to pass another on the street unless it has stopped to take on or discharge passengers. Thus bus traffic flows in a steady, even line, undue haste is eliminated and a greater margin of safety is insured. Many of the lines terminate at the Hudson and Manhattan tube station, which is a direct line to New York City. Here the drivers are under the direction of a starter and are not permitted to leave until they conform to the proper head-way system.

One of the problems which has been successfully combatted by the city department is that of dishonesty among the drivers. The department keeps a complete system of records and compels the driver to turn in daily records giving the number of passengers, the trips made and the time of each trip. This last plan has proven of inestimable value. Let us assume by way of example that a certain bus, thought to be No. 23, causes an accident at a certain point and continues on without stopping. Let it be further assumed that it was not bus No. 23, but No. 32 that caused the accident. Such discrepancies are often the case.

The driver of bus No. 23 is arrested, but protests his innocence. His daily record is investigated and at the hour of the accident—let us say noon of Thursday—his bus was in an entirely different section of the city. The department pursues its case and checks up the record of bus No. 32, with the result that this bus was undoubtedly in that vicinity at that time of day. Whether or not the driver confesses is not pertinent to this story, but at least an innocent driver has been exonerated.

As for the profit of the business to the individual driver, it depends, to a certain extent upon his business ability just as in any other line of work. The great majority of Newark operators make money.



Type of Trolley Bus Which Will Be Used in Toronto, Can. Electric Equipment Is Very Similar to That of Trolley Bus Used in Detroit.

Trolley Bus in Canada

City of Toronto Purchases Packard to Be Equipped with Westinghouse Control and Two Type 508-A Electric Motors.

THE Toronto Transportation Commission has recently placed an order with the Packard Ontario Motor Car Co. for four complete trolley busses for service in the city of Toronto. Bodies for these busses will be built by the Canadian Brill Co., and all electrical equipment will be supplied by the Canadian Westinghouse Co. The busses will be completely assembled in Canada by the Packard Ontario Motor Car Co. This is the first trolley bus installation sold for Canadian delivery.

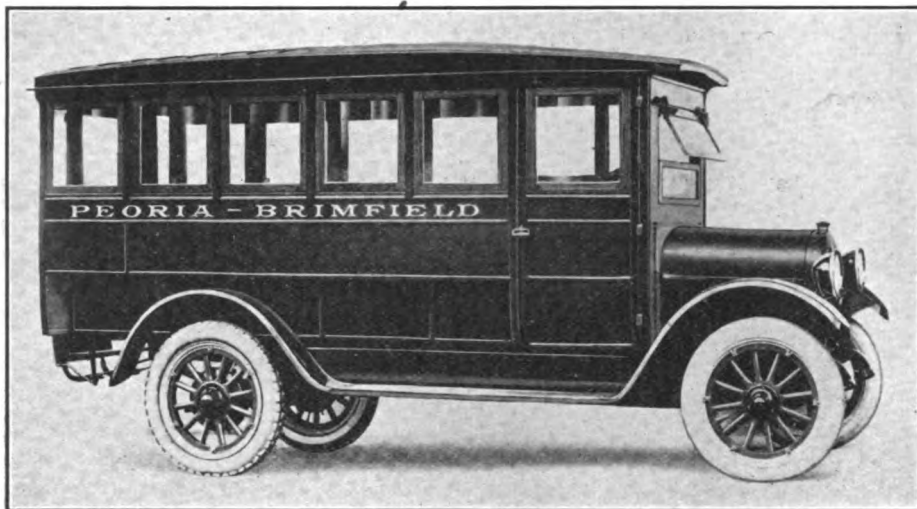
THE busses will be similar in construction to the demonstration vehicle completed by the Packard Motor Car Co., Aug. 22, 1921, and they will be used to furnish transportation service in the outlying districts of Toronto, which are at the present time inadequately supplied with service. The electrical equipment will be essentially the same as that used on the Packard demonstration bus mentioned above and on the bus recently completed by the St. Louis Car Co. and now in Detroit for demonstration purposes.

The design of the electrical equip-

ment is such that no unsightly or bulky portions of the apparatus are located inside the body of the vehicle, the only portions of the apparatus inside of the bus body being two snap switches, the reverser handle, the overload trip and reset buttons and the foot pedal. The control is of the all foot type, making use of a well designed foot pedal pivoted at the instep so that the operator's foot rests comfortably upon the pedal at all times. The foot pedal, through a suitable link work, revolves the drum of the master controller, which is interlocked with the offset knife-blade type reversing switch. Three points are definitely indicated in the operation of the foot pedal. The first is a slow speed switching point for use when the vehicle is following very slow moving traffic, the second gives series running, while the third or last position is the parallel or full speed notch.

The master controller, in conjunction with a sequence relay, controls the functioning of a motor driven sequence switch. The drum development of the latter provides for the closing of the various contractors in

(Continued on Next Page.)



Strongly Constructed and Well Designed Body That May Be Used on All Makes of Truck Chassis. Manufactured by E. M. Miller Company, Quincy, Ill.

Miller Body Is Quality Product

E. M. MILLER CO., Quincy, Ill., a manufacturer of fine coach bodies, with a record dating back for a period of 64 years, has now turned its attention to the motor bus field and is building a series of standardized bus bodies which have attracted considerable favorable attention, it is stated.

THESE busses, which may be mounted on any truck chassis are substantially and strongly built to stand the strain of constant usage, says the manufacturer, and possess tested, proven factors that have made the company's product well known throughout the country. Because of the standardization practised by the company the purchaser

is assured of obtaining spare parts at a minimum of time, although the initial installation, barring unforeseen accidents, is calculated to give constant service covering a long period. The specifications of the vehicles are as follows:

Body—Sills, posts, pillars, bars and all parts requiring strength, made of tough white cane ash or oak, carefully mortised, all joints glued and screwed, and all corners carefully ironed. Principal panels of specially prepared vehisote.

Roof—Tightly matched poplar supported by curved ash bows apart. Outside of roof covered with heavy white sail duck set in white lead. Strips for baggage.

Rail and Ladder—Iron baggage rail around the top and forged iron ladder up the rear.

Glass—Extra heavy 3/16 in., carefully selected.

Arrangement of Glass—Either set in hard wood frames all of which on each side and the one in the door in the rear, raise and lower without being removed, or frameless type. Frameless type has felt lined channels for the glass to slide in.

Windshield—Front of body approved

type, built-in, two-panel, double tilting, ventilating windshield, 3/16-inch plate glass.

Doors—Two doors; one at rear 36 inches wide and one at right side forward end of body 25 inches; each door supported by extra heavy hinges. Each door complete with spring coach lock, bright nickel plated handles inside and out.

Step—Two-tread rear step complete with hand-forged irons. Treads covered with rubber.

Seats—Passenger carrying seats start at the rear of the body and run forward. Seat on right hand side of Model 1014, 94 inches cushion front, and seat on left hand side, approximately 75 inches, depending on the position of the steering wheel of the chassis that is used. On model 1016 each cushion is 24 inches longer than mentioned above. Driver seat arranged with specially hinged lazyback. All seats with spring cushions.

Style No. 1014 designed to carry 10 or 12 passengers and No. 1016 designed to carry 12 or 14 passengers.

Special Arrangement of Seats—By special device passenger seats can be folded up, thereby giving loading space for freight. Special arrangement of seats costs \$50 per body.

Upholstering—Best artificial leather on spring cushions, tops of the cushions stuffed with hair, interior of roof trimmed to match lower part.

Floor—Made of ship-lap and covered with carefully laid aluminum bound with linoleum so that gas cannot come into body of bus.

Electric Devices—Two electric dome lights and wires and switches connected with electric source furnished with the chassis.

Mounting—All mountings, such as door handles, finishing screws, dome lights and any other small parts, bright nickel finished.

Painting—Thoroughly good coach job, any standard colors, and any reasonable amount of genuine leaf lettering along belts.

Interior Finish—Wood work carefully surfaced, filled, stained natural wood and carefully finished with durable varnish.

Principal Dimensions—On the 1014:

Length inside of body.....10 feet
Length of right cushion...7 feet 10 inches
Length of left cushion....6 feet 4 inches
Height from cushions to head

lining44 inches
Aisle28 inches
Top of cushions to floor.....18 inches
Depth of cushions.....16 inches

Principal Dimensions—On the 1016 are exactly the same as on the 1014, except 24 inches longer inside and one more drop glass on each side.

Weight—Actual weight of No. 1014 body only 1525 pounds; No. 1016, approximately 1600 pounds.

(Continued from Preceding Page.)

the proper sequence to accelerate the bus to the full series position, accomplish transition and complete the acceleration to the full parallel position. Within certain limits the speed at which the sequence switch drum revolves is inversely proportional to the current flowing through the main motors. It is impossible, however, to completely stall the sequence switch motor, so that this scheme of operation also affords the benefits derived from a time element control without the disadvantages ordinarily encountered. Thus it will be seen that when the bus is

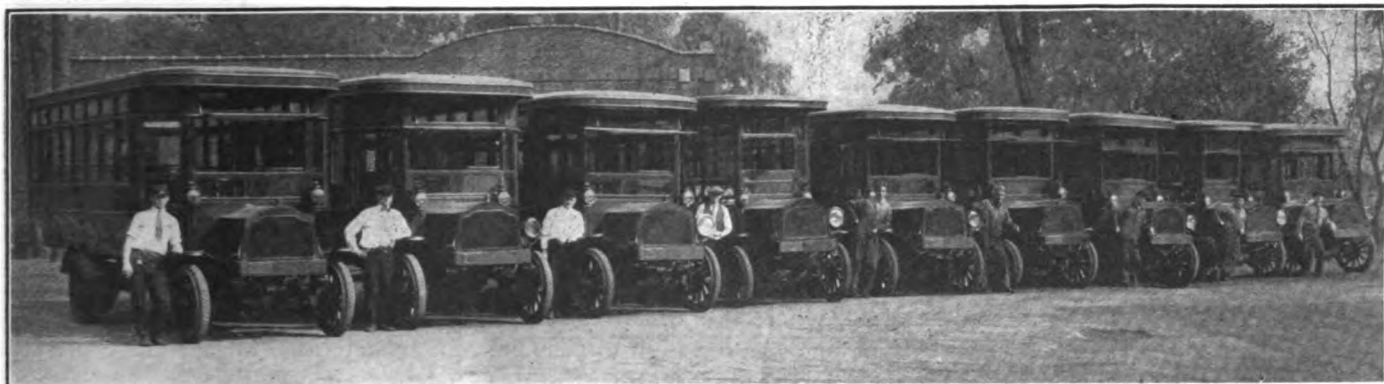
heavily loaded or ascending a grade, the acceleration is slower than when the bus is running light on a level street. At the same time the acceleration is positive under all conditions of load and grade. There is no necessity of auxiliary bypass buttons or notching levers, so often required when automatic control is applied to city service.

A double-pole line switch in connection with a suitable overload trip offers protection to the equipment from severe overloads. A four-blade double-throw cut-out switch provides for cutting out either of the motors in case of a mo-

tor failure. The reversing switch is so constructed that the handle may only be removed when the blades are in the neutral position. When in this position an interlock prevents the master controller from being operated. When the reversing switch is in the forward or reverse position the same interlock provides protection against any attempt to change its position with the controller "on."

The accompanying illustrations show the method of mounting the apparatus in the right and left hand sides of the hood compartment,

(Continued on Page 100.)



Packards Make Up Detroit Municipal Bus Fleet, Which Is Used to Carry Passengers to Bell Isle Park in the Summer.

Detroit Bus Lines Efficient.

Michigan City, One of Last to Adopt Motor Carrier Now Has Well Equipped System—Mayor Couzens Said to Favor Municipal Ownership of All Traction Interests.

(By MILTON JAMES MORGAN.)

LIKE a shoemaker's wife, whose shoes always are unrepaired, Detroit, known throughout the world as the home of the automobile industry, is one of the last really large cities to turn to motor driven vehicles for urban transportation. Detroit, however, has made a start, and for nearly two years gasoline motors have been taking up a share in the task of daily carrying a million inhabitants to their work, business, shopping and play. Today there is a capable company operating the latest type motor busses, mostly double-decked, over routes totalling 22.2 miles, with numerous extensions planned. During the rush hour 70 double decked busses are on the streets carrying capacity loads. Additions to routes and equipment are planned. In addition there are about 700 automobiles doing jitney service throughout the city, and several interurban bus lines that enter Detroit.

FOR a clear understanding of how the motor bus made its introduction in Detroit, some of the problems it has met and is facing and what the future may hold for it, a brief survey of the traction system in the city is necessary.

Practically since the inception of street car transportation that of Detroit has been owned and controlled by the Detroit United Railway. For 40 years it has been the subject of political fights, the "street car war" being of longer duration and fought with more intensity in Detroit than in any other American city. Each succeeding administration in the city put forward some plan to "beat the D. U. R." These either were turned down by the voters or proved of no constructive value.

In 1919 James Couzens, multi-

millionaire and former partner of Henry Ford in the Ford Motor Co., took office as mayor of Detroit on a municipal street car line ownership platform. He succeeded in having a \$15,000,000 bond issue approved, the money to be used in the construction of an M. O. system.

Throughout his administration, which will run for nearly two years longer, he having been re-elected, Mayor Couzens waged a bitter fight on the traction company. As a result of his efforts about 100 miles of municipally owned street car track is in operation and the city has a 50-50 working agreement with the D. U. R. by which both use the same rails on several important lines. A plan now is under way for the purchase of the remaining city system of the D. U. R. by the city.

During the battle with the street railway company Mayor Couzens used every instrument and device obtainable to bring it to terms. It was this which aided the establishment of the motor bus in Detroit, the administration welcoming anything that would cut into the car company's revenues and thus, indirectly, make it more amenable to the municipal ownership programme. And it is this municipal ownership idea which is threatening continued motor bus operation by a private corporation.

Mayor Couzens has stated that he favors motor busses as feeders for the street railway system. Also that he wants them owned by the city, going so far as to declare that no privately owned and operated mode of urban transportation should be permitted.

The formation of the Detroit Motorbus Co. followed the lines of good business policy. The idea was quietly introduced more than two years ago. While there was no fanfare of trumpets or glittering promises, publicity was obtained and financially strong business men of the city interested. The stock was disposed of in a conservative way and virtually every share of it is owned by residents of Detroit. Its officers are:

President, W. F. Evans, vice president and general manager of the Standard Screw Products Co.; first vice president, Sidney D. Waldon of the Packard Motor Car Co.; second vice president, Harold H. Emmons, prominent Detroit lawyer and business man; secretary and treasurer, William B. Colburn.

With this array of representative Detroit business men, and in view

of the traction light situation, the city granted the company permission to operate on certain streets, but balked at issuing any franchises. The bus company operates on a day-to-day agreement that may be terminated at any time by the city council. The city council also passes on all routes of the company, although the real decision is made by the mayor and his board of street railway commissioners. The bus company, needless to say, so far has not operated any line that would compete with city owned car routes, although the busses charge a 10-cent fare with transfers as compared to the five-cent fare of the street cars.

When permission to operate was granted the motor bus company, Albert E. Hutt, for years with the Fifth Avenue Coach Co., New York, was engaged as assistant general manager. Practically all of the details of operation are in the hands of Mr. Hutt.

Orders were placed for 20 of the A type busses made by the Fifth Avenue Coach Co. The L type bus, of the same seating capacity, but lower, was preferred, but quick deliveries could only be had on the A type. This is mentioned as later it will be seen as presenting one of the large problems of the company.

On June 11, 1920, the first line started operation. Eight busses were placed in service, running from Grand Circus park, the hotel center

and boundary of the shopping district, to Waterworks park on the east side. The route traversed Woodward avenue, Detroit's Broadway, to Jefferson avenue, the main thoroughfare paralleling the Detroit river easterly. An eight-minute service was given. Shortly afterward this line was extended north to the Michigan Central railroad viaduct, where it was halted as the A type bus was too high to pass beneath the viaduct. Other routes were established, and with the receipt of the first consignment of L type busses, routes were pushed further, passing the viaducts that heretofore had blocked the way.

At present routes operate on Woodward avenue to Grand Circus park, and thence on both sides of Woodward avenue, extending north to Highland park. They extend east, via Jefferson avenue, to the city limits, and westerly on Lafayette boulevard for nearly three miles from the center of the city. Another line runs to the northwestern district, via West Grand boulevard and Dexter boulevard. Proposed routes would operate on the entire East and West Grand boulevards, which loop the city from river to river, and extend existing lines. These proposed routes have been submitted to the city officials, but no decision has been announced as yet.

The present equipment of the company consists of 20 type A busses and 50 of the L type. Or-

ders have been placed for some of the J type busses of the Fifth Avenue Co. These have no upper deck and are one-man operated. Entrance and exit is by the front door, where the driver can act as conductor. These will be used, according to Mr. Hutt, for special service where the double-decked bus is not warranted, and for charter. The company has found a lucrative field in chartering busses for private parties, such as theater parties, picnics and for sight-seeing purposes to convention delegates.

The first bus starts on its route at 6 o'clock in the morning and the last enters the garage at 2 o'clock in the morning. The rush periods have been found to be between 7:30 o'clock and 9 in the morning, and between 4 and 6 in the afternoon, with the peak of the day between 5 and 6 p. m. At that period it is endeavored to have the full equipment in service.

A large brick garage was erected by the company at Edlie street and Terminal avenue, near the terminus of the eastern line. It is planned to erect another garage in the northwestern section of the city. It will work for economy of operation and save many dead miles now traversed by the busses twice daily going from the garage to the start of their routes, Mr. Hutt said.

All repairs, overhauling and rebuilding work is done at the garage by the company employees. Most of these work during the day, with only sufficient men on at night to do emergency road repairs. There has been but little of this emergency work, Mr. Hutt reports, and he gauges the efficiency of his garage force by the number of involuntary stops the busses are forced to make because of mechanical difficulties.

At the end of each 2000 miles operation, which is from 10 to 15 days, each bus is taken to the garage and given a general overhauling. Five busses are handled a day and they are finished in time to run during the evening peak load period. Each bus is entirely rebuilt yearly and any improvements discovered during the year are added. Mr.



Substantial Construction and Low Gravity Center Make These Busses Safe.

Hutt shortly expects to be able to rebuild a bus a week.

Changes now being made to busses being rebuilt is the addition of two seats to the upper deck. Both A and L type busses seat 22 inside and 26 on the upper deck. By moving the seats on the upper deck forward the seating capacity is increased to 30 and makes a more balanced job, according to Mr. Hutt. Batteries as are used on the New York busses have been replaced by lighting generators. By doing all the work, including the painting, in the company's garage, money is saved, Mr. Hutt reports.

But little trouble with labor has been experienced. Drivers are paid 65 to 70 cents an hour, according to length of service, and conductors 60 to 65 cents. The record of applicants for the past five years is looked up and then, when selected, the men are placed under instruction. This usually requires a week. All work as conductors first, the prospective drivers doing this to familiarize themselves with all the duties of operation before being entrusted with a car.

"We have a fine lot of men," declared Mr. Hutt, "and the public shows its appreciation, frequently complimenting the company on the quality of its employees. We are conducting a campaign for courtesy with a view of cutting down the number of street accidents, and wish that other motorists would follow suit.

"If the old-fashioned courtesy of the road could be revived it would eliminate 75 per cent. of the accidents."

With the 10-cent fare universal transfers are given from one bus line to another. At present the longest ride without transfer is 11.7 miles and with transfer, 12.8 miles.

From the June day the first bus passed through the city they have found favor with the riding public. In the summer it is difficult to get a seat, the busses loading to capacity at the starting places of routes going from the center of the city. During the winter riding is not as heavy, although the upper deck attracts passengers except on stormy

and the coldest days.

The general policy of the company was summed up by Mr. Hutt as follows:

"We count on the good, efficient service given to keep in good favor with the city administration and public. And we believe the administration has the good interests of the people at heart."

Rather a long step from the "public be damned" policy made famous some years ago by a railroad official.

The riding public of what might be termed the "middle class" are loud in praise of the motor bus. There appears to be no objection to the 10-cent fare. This may be partly due to the policy of the company not to accept passengers if no seats are available. Ten cents with comfort and service appears to find favor. On the other hand several years ago and during more prosperous times a raise in fare from five to six cents by the street railway company caused a riot that for hours disrupted car operation.

One of the last lines to be installed by the company was the one on Dexter boulevard, the most north-western route. It was put into operation on petition of residents of that district. It is a highly restricted residential district of business executives and professional men, most of whom own automobiles. The busses, however, are generously patronized.

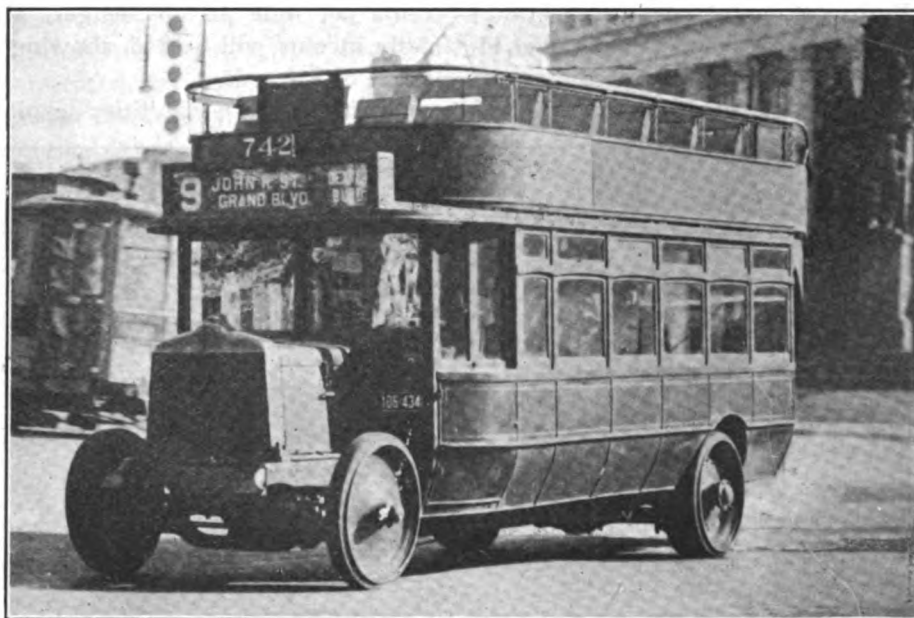
A survey made for purpose of this article disclosed a decidedly contradictory opinion among residents of that boulevard. Where homes were rented the tenants were heartily in favor of the busses, while most of the home owners were opposed. This was explained by the fact that operation of the heavy busses, particularly when one of the rubber tires had a flat place, shook the houses as the busses passed. Home owners hold this continued shaking, though not nearly as pronounced as that made by street cars, quickly will depreciate their property. No objectors to service were found.

The jitneys are not beloved by the bus company. They take many of the short—and profitable—riders, according to Mr. Hutt, and are unfair competition. He holds that the jitney men are not responsible and cannot be depended on to give steady transportation.

The jitney situation resembles that of the bus lines insofar as having no stated time operating rights. It differs in this particular that it is virtually unorganized.

Jitneys came into existence in Detroit in the early fall of 1920 shortly after the bus lines started and when factory unemployment began. They were introduced by a few men who came from eastern cities where jitneys were in operation. These men advertised for men with automobiles

(Continued on Page 97.)



Detroit Crowds Seem to Like "Double-Deckers" and Extend Liberal Patronage.

How About the Profits?

**President of Representative Truck Building Company
Tells of Money Making Possibilities of Bus Operation
Citing Specific Instances of Successful Lines.**

(By WALTER E. PARKER, President Commerce Truck Co.)

THE motor car industry has been the greatest industrial development of the past decade, and is about to furnish to the world another subject for wonder and envy. The fast growing use of motor bus transportation gives promise of phenomenal development during the next few years and will have a marked influence on the life of the nation. It carries with it great possibilities of profit to the small investor as well as to the great capitalist. The next few years will see the foundation of fortunes laid that will compare with those which were the development of the interurban traction lines during the past 20 years. The motor bus transportation business, however, has this added attraction: To build and equip an electric line required so much capital investment, measured in not less than millions, that only those who commanded millions were able to engage in the business.

Motor bus transportation is open to the man with limited capital as well as to the man with millions. From the records of those operators now operating bus lines, we find the cost of operation to be less than one cent per mile per passenger, includ-

ing all overhead, operating, insurance and sinking fund charges. We have before us the records of a motor bus company, with an investment of \$30,000, operating four motor busses on a certain route that is earning 70 per cent. for its stockholders, in addition to providing a sinking fund sufficient to maintain all necessary repairs and replacements and to retire the entire investment in equipment within four years, and they are doing this in a territory already served by electric railroads.

A motor bus seating 20 passengers requires an initial investment of from \$4000 to \$5000 and costs, including all charges specified above, just under 18 cents a mile to operate.

There are many districts in this country where a round-trip route can be easily found where the distance travelled will not exceed 50 miles and where a bus can easily make three round trips a day, at a cost of \$27, and if only carrying 60 per cent. capacity, at a charge of 2½ cents per mile per passenger, the daily income will be \$45, showing a profit of \$18 a day.

With these possibilities capital

will be attracted to the business and stocks of motor bus companies will become fashionable with investors all over the country. New companies, both small and large, are being formed to take care of the demand for motor bus transportation.

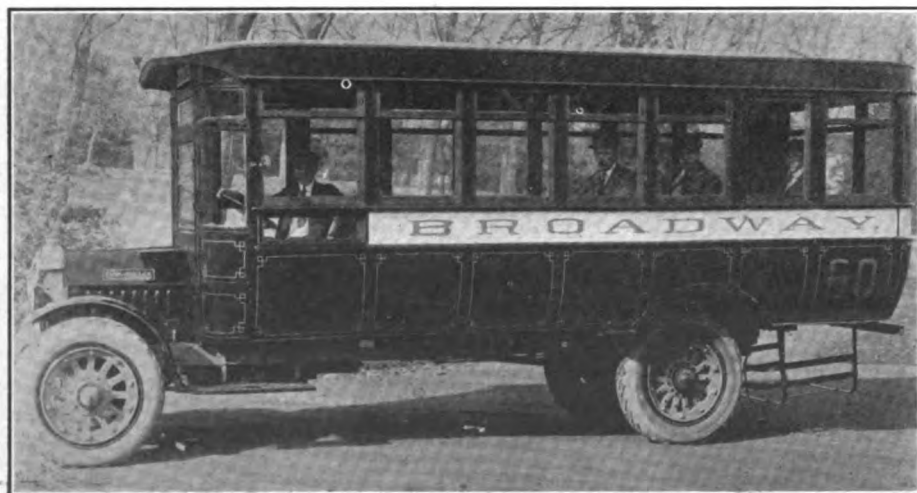
Motor truck factories will be busy supplying the demand for motor busses, as the United States is full of far-seeing men who are quick to grasp an opportunity and who will wish to be among those who are the first to ride into fortune on a motor bus.

The following figures were taken from the actual expenses with a fleet of Commerce motor busses operating in a Michigan city with a population of about 50,000:

Average mileage.....	100 miles per day
Total mileage in year.....	36,000 miles
Average operating.....	12 hours per day
Gasoline consumed 4069 gallons.....	\$1133.01
Oil consumed 210 gallons.....	\$122.75
Grease consumed, 45 lbs.....	\$7.20
Tires, entire expenditure.....	\$690.49
Garage cost.....	\$180.00
Wages paid, 55c per hour.....	\$2272.50
Repair parts and incidental expense	\$284.81
Insurance, including indemnity.....	\$771.50
	<hr/>
	\$5462.26

Total cost, before depreciation, 15.17 cents per mile operated, based on seating capacity of bus 7/10 cents per mile per passenger.

These Commerce busses now operating are showing gross receipts of over \$11,000 per annum. This will vary according to locality and condition. For proper estimates, if you charge a passenger fare of 2½ cents per mile, it should show on 60 per cent. of the seating capacity of the bus an income of 35 cents per mile, or a total gross profit of 19 cents per mile operating 100 miles per day will show gross profit of \$6840 per annum. We suggest to prospective operators that a very conservative plan to follow is to set



Commerce Truck Chassis Are Well Adapted for Installation on Bus Routes.

aside from their gross profits a sinking fund to amortize their capital investment in the bus of 40 per cent. per annum in addition to the repair charges listed above. This may be calculated as \$2000 per annum. If this plan is followed each bus will earn a net cash profit of \$4840 per annum and at the end of 2½ years the sinking fund will amount to \$5000. The net profits for a period of 2½ years will be \$12,100 plus the sinking fund of \$5000 represents a total gross profit of \$17,100, from which must be deducted the cost of the bus complete and to which may be added the value of the equipment at the end of 2½ years, which will depend upon the care given it by the owner. The charges for repairs will maintain it in good condition.

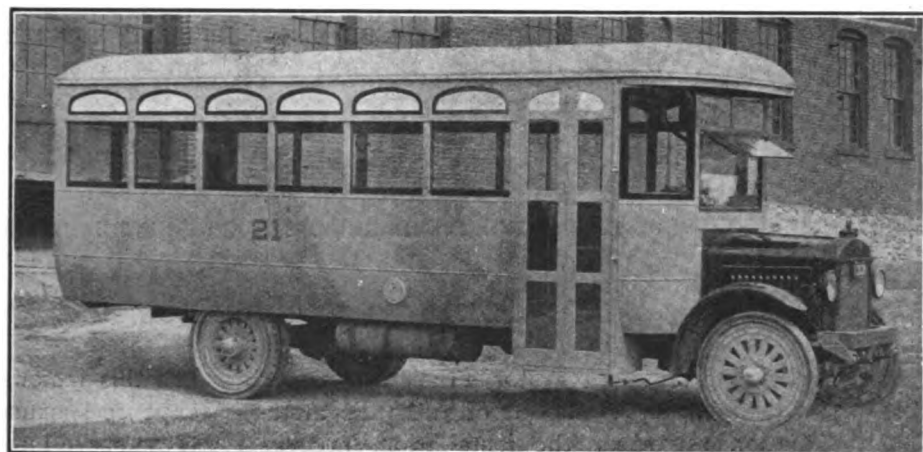
The foregoing results (and remember it is being done by owners now) clearly show that provided a proper route is selected an owner of a 23-passenger Commerce bus upon an investment of not over \$5000 can pay a driver \$2275 per year (it may be himself), replace the \$5000 in his bank account in 2½ years. Earn a net income of \$4840 for himself each year over and above these two items.

The American people are spending approximately \$4,000,000,000 a year for automobile passenger cars, and \$2,500,000,000 a year for trucks, including both first cost and operation.

(Continued from Page 95.)

who were out of employment. They were induced to join a jitney drivers' association, paying a membership fee. This entitled them to operate as jitneurs. The organizers had obtained permission from the city officials. This was granted for two principal reasons, as near as can be learned; one, that it would aid the unemployment situation, and the other, that it was another weapon to be used in the fight against the street car company.

The jitneys charge a 10-cent fare except between 1 and 5 o'clock in the morning, when 20 cents is charged. No transfers are given. All are passenger automobiles, mostly enclosed body types, and many are heated during the winter



Hoover Body. Specially Designed, Has Good Lines and Correct Balance.

Hoover Bus Body

THIS bus body was especially designed by the Hoover Body Co., York, Pa., for the new Republic Knight motored bus chassis. Several of these are being operated in various sections of the country at the present time. Negotiations are being conducted by the Republic Co. with the United Railways Co. of Baltimore, Md., concerning this equipment.

The distinctive feature embodied in this bus is the special framing construction by means of which a low center of gravity is obtained without sacrificing head room. The curved front quarters with curved glass gives the driver unlimited vision. The roof is riveted to the carlines, this preventing twisting

and raising at the edges. There are removable sections at each rear wheel, which when removed allows the wheel to be entirely removed from the axle.

The interior is lined and finished in mahogany. All windows are in drop sash. Excellent ventilation is obtained by ventilators above the windows. Lights are conveniently placed and there are push buttons connected to a buzzer on each post.

The seats are upholstered with Spanish leather and are arranged to give maximum standing room. The equipment is particularly complete with illuminated destination sign and illuminated fare box. A nickel plated mirror above the driver's seat gives rear vision.

months.

As before stated, the jitneys are operated by individuals with no other ties to each other than that afforded by their associations. The men operating them say they are just making a living, and it is probable that a full resumption of factory work would cause a substantial decrease in the number of men in the jitney business.

It is fully apparent that a considerable number of Detroit's populace is "sold" on motored transportation, even if it costs double that of the street cars. So much is this the case, that it appears no city administration will attempt to prevent this kind of transportation, and this is one of the assets of the motor bus company.

On the other hand, there is the avowed intention of operating all city transportation on the M. O. plan. The initial move toward this has been taken, the city council authorizing the street railway commission to purchase busses to be operated from the Michigan Central railroad station to the hotel district.

MOTOR BUSES ARE BUSY IN TOLEDO.

More than 70 motor busses in service on Toledo streets are carrying approximately 15,000 passengers a month, according to recent estimates.

Connecticut has 2½ families to each automobile in the State.

PERTINENT POINTED

FUNDAMENTALS OF BUS SERVICE.

IN THIS number of Motor Truck the reader will find a large amount of authentic information regarding the installation, maintenance and operation of motor bus lines throughout different sections of the country.

It has not been easy to gather the large amount of data presented in these pages. For one thing it has been well-nigh impossible to secure complete and specific details of the financial side of the business, few operators being willing to open their books to the investigators, who in the majority of cases have had to be content with the story told by lump-sum figures. The general summary of these data however, emphatically proves that the bus business, in more than 90 per cent. of cases, is highly profitable—this, provided the operator has studied into the latent possibilities of his territory, has carefully chosen his routes and even more carefully selected his equipment.

The man just starting in the bus business will find certain basic facts in the following that he should bear in mind if he is to succeed. One important point which is stressed by all who have engaged in the work is that the operator should ask and expect to receive a free hand in the operation of his busses from city and town officials, provided that proper service is given and traffic rules rigidly followed.

In the majority of cases investigated by Motor Truck's representatives it has been found that the authorities have placed few obstacles in the way of the operators, although electric traction influences have had to be combatted in nearly every instance. The views of the people are wholly in favor of the motor bus, however, and in nearly every instance their will eventually has prevailed, despite the exaggerated reports to the contrary.

Another point brought out by the investigation, which has included more than 60 bus installations in 32 states, is that the operator—especially the larger one, should have sufficient reserve equipment to take care of all unusual demands on peak business, as well as to handle the emergency that occasionally will arise. This is economy and the extra busses necessary to estab-

lish this factor of safety are an asset and not an expense because the increased business pays for these spare busses in a very short time.

Still another fact to be considered carefully has to do with the selection of employees. The personnel of the bus operating system must be of the highest type. This is imperative. The most costly mistake the bus owner can make is to hire low priced help. The best is none too good because the bus operator is selling service and courtesy rather than transportation. **At the present time the motor bus business is not conducted on the competitive basis of dollars and cents, but rather as a competition of service, and since the average fare charged by the motor carrier is larger than the average street car charge, the bus operator must pay particular attention to satisfying his customers. Failure to do this means the failure of the system—the reason being obvious.**

A most important point in the operation of the bus line is that of system, or management. Perhaps no other branch of the automotive industry calls for more careful accounting and checking up than that of motor bus operation. The best system this writer has seen is that of charting the work of each department as practised by the Fifth Avenue Coach Co., a synopsis of which is given in the leading article of this magazine, although it is realized that there is no set rule by which this phase of the matter can be decided so as to apply to all installations.

A well planned, up-to-date repair shop is an absolute necessity to the bus operator who operates more than one or two busses. All motor busses, because of the strain of continual stopping and starting need overhauling at certain periods if they are to measure up to the proper economical standard, and the same economy standard makes it necessary that this work be done by the operator for the reason that he cannot afford the charge which the service station must make for this class of work, much of which will have to be done at night. The repair and servicing of the motor bus is almost a specialized part of the repair business and the careful operator will see to it that he has available at all times

COMMENT OF THE DAY

plenty of first class mechanical help, and the best of tools and equipment. In this line of work "the best is always the cheapest," as many a man has proved to his satisfaction. Undue stress may seem to be laid on this phase of the matter, but it is vital since economical mileage is the most important factor of bus operation, and only by the most rigid inspection and mechanical attention can leaks and losses be traced and stopped.

At the present time a small majority of operators seem to favor the one-man type of bus in which the driver also collects the fares. This type of bus, on certain long routes where traffic is light and stops are not frequent, works out very satisfactorily, but where conditions are the reverse it seems that the two-man type is the best, since time is saved and the passengers undoubtedly are given better service. This however, can best be determined by conditions of the routes travelled, although it may be said in passing that the vast majority of passengers favor the two-man type of bus.

Aside from the good service it gives the flexibility of the motor bus is one of the features that recommends it for public use. For instance, there is almost no limit to the length of the routes that can be served by the bus. The matter of expansion can be taken care of at short notice and without added outlay. Routes can be arranged to be directly competitive with steam and electric cars, or they may be operated on paralleled lines. The equipment need only be operated as the increase in patronage demands; it may be diverted in the event of temporary obstruction; new routes can be established or changed according to conditions—all at no extra cost. Also, if the demand is sufficient to warrant it, the vehicles may be put out at private hire.

The motor bus line is usually looked on as a local institution by the public which seems to take a certain pride in such development and for this reason criticism rarely grows to the point where it cannot be readily overcome. Whether or not this is due to a certain feeling of antagonism against the street car companies is not pertinent to this article. The fact remains that the up-to-date bus installation is welcomed by the majority of persons and the diplomatic manager will have few if any political issues to contend

with, although the foregoing emphatically does not apply to the "jitney," of which the least said the better.

The outlook for properly financed, well equipped and operated bus lines was never better. With the street car companies endeavoring as they are to pay interest on inflated principal, conditions are such that fares must be increased and all routes zoned in a way that will call for much higher passenger rates. In fact, many of the street car companies actually have limited service to an extent that in effect has forced the installation of the motor bus to cover the many miles of territory from which car service has been withdrawn.

All of which guarantees the future of the motor bus. There is, nor will be, no better time than the present for the installation of bus lines. The equipment available is surprisingly efficient, the body and chassis builders having made remarkable strides in the work during the last two years. With the already large number of bus lines now in operation, ample opportunity is offered for a personal investigation and a direct survey of the work as a whole, giving the prospective operator a chance to secure first-hand information covering every detail of the service. It is entirely probable that the operator who will carefully choose his location and equipment will have no occasion to regret going into this highly profitable business—regardless of whether he starts in a large or small way.

APPLESAUCE AND TAXES.

WEBSTER defines "Luxury" as "Lust; Exuberance; Something Costly or Difficult to Obtain; Idle Hours; Poetic Dreams." The modern authority, Washington (D. C.), defines it differently and makes it into a heterogeneous bouquet, which includes Lip Sticks, Silk Underwear—and the Automotive Industry. Now certain learned gentlemen apparently lacking sense of humor, fitness, proportions and simple justice, talk of extracting a third of the soldiers' compensation from the already overtaxed industry. They will not succeed. They don't want to. They're merely playing leap-frog to satisfy certain constituents. So don't worry.

(Continued from Page 86.)

lic service corporations.

Goodyear officials have stated they found the operating characteristics of the motor bus lines to be identical with those of street railway lines and a fair idea of what may be considered operating factors can be learned from the established principles of street railway operation.

Attendant to the development of the Goodyear lines was the beginning of lines whose owners saw the possibilities in sections of the city where residents were without street railway service. Correctness of the ventures has been proved by the half dozen busmen who started with one car and have rapidly added others by reinvesting the earnings of the first bus.

Five years ago C. L. Tschantz, a rubber worker, who had saved his earnings and believed he could make money in the "jitney business," interested two other men and the three invested capital with which they purchased several small touring cars. Permission to run from a down-town street corner through newly opened streets to a new suburban section was granted by traffic officials.

The line was maintained for nearly a year, but the company lost money. Hired drivers proved undependable and the route was a long one in consideration of the few passengers who could be carried per trip. It was hard to hold to a schedule and residents along the route felt they could not depend on the little cars for regular service. They only used the jitneys on chance occasion, Tschantz found.

The company was dissolved and the stock bought up, but the motor bus bug would not leave Tschantz, who thought he would try another way. He purchased a large auto and built a bus body. He drove the bus and made regular round trips, often working from 12 to 14 hours per day. Soon he had a few regular passengers and the few increased until the bus was continually crowded. The bus had paid for itself and made a profit and Tschantz knew he had established a foundation on

THE CLEAN ENGINE.

IF MORE owners of automobiles would give some of their spare moments when not driving to looking over the engine, they would not only save themselves considerable trouble, but would also be cutting down the price of upkeep of their car. Cleanliness is an important factor in the care of any vehicle. There are many exposed parts which, if allowed to collect dirt, soon will cease to function. Keep your engine clean and you will avoid much repair work.

which to work.

He bought a White truck similar to the one being used by the Goodyear company and in three years the single bus line has increased until now business on the same route supports five large modern busses. Carefully selected drivers operate the busses and run on a strict time schedule.

The writer had occasion to ride over the route recently. The driver of a bus stopped at the curb to pick up a passenger and noticed a workman a half square away running to catch the bus.

"That man will have to run faster if he catches this bus. I'm a minute behind now," the driver said good naturedly. "We run strictly according to schedule," he explained as he shifted into "high" and pressed the accelerator.

How different from three years ago when the jitney driver slowed up his car at each cross street and looked in each direction for a possible passenger on the same route!

Tschantz's busses are typical of the others in the city. He runs on six-minute schedules during the rush hours and moderates to eight and 10-minute trips during the day.

Lewis Zeno is another bus operator whose story is interesting. A year ago he started over a street carless route and today owns three busses which run regularly.

That the motor bus has become a "dignified common carrier" is

shown by the success of the bus line which is routed through Akron's most exclusive residential district. Although the bus and street car lines almost converge at the end of the route, bank clerks, business men and club women prefer to wait a few minutes for the bus than walk a block or two to the car line.

"The bus is faster," is about the only reason one hears from them. But the motor bus is efficient and comfortable—this is the true reason for its popularity.

Motor bus accidents in Akron have been remarkably few. One suburban bus turned over near Akron a year ago, but none of the passengers were seriously injured. One bus passenger lost his right arm a year ago when the bus from which he extended his arm passed close to another car in a traffic jam. The bus owners were made joint defendants in the case and a jury ordered each bus owner to pay the passenger \$1500. Insurance protected the bus owners.

A dozen busses are owned by the Cleveland-Akron line. Tickets between the two cities are several cents cheaper than the interurban railway and the busses make time equal to the limited cars. Busses run hourly between the cities.

There has been little municipal legislation governing the motor bus in Akron. Thus far the problems which arose have been ironed out by local traffic officials. A \$35 license which includes the federal tax is required and bus owners are held strictly to specific traffic regulations such as overloading, passenger stops and time limit for parking.

City officials have not been disposed to disfavor the bus and it has not had to combat with any special restrictions. Officials of the street railway company have remained silent as Akron's bus system gradually and surely extended into the territory where street car extensions would naturally be expected.

But one move, and that recently, has been made by the car company to enter the bus field. Several months ago eight large busses were ordered by the traction company.

These are used as "feeders."

Selden Perfects Two Bus Units

Well-Known Motor Truck Manufacturer After Exhaustive Tests Completes Chassis Specially Designed for Passenger Haulage Service.

AFTER considerable investigation into the needs of the passenger transportation business, the Selden Truck Corporation, Rochester, N. Y., has introduced two new chassis, units 31 and 51. Selden unit No. 31 is rated at $2\frac{1}{2}$ tons maximum, has a wheelbase of 147 inches and a space of 14 feet eight inches back of the dash. It is built for a body having a seating capacity of 18 passengers, with standing space for probably 18 more. Left hand drive is standard. The motor is a special Continental, $4\frac{1}{2}$ by $5\frac{1}{4}$, equipped with special warming device and water syphon. The transmission is in unit with the motor and has four forward speeds. The clutch is the multiple disc type with 11 discs. The Selden full-flexible frame is used with all units flexibly mounted and having bolted construction throughout. Malleable iron wheels are standard with pneumatic cords, 34 by five front and 38 by seven rear.

SELDEN unit No. 51 is rated at $3\frac{1}{2}$ tons maximum, has a wheelbase of 179 inches and 17 feet five inch space back of the dash. It is built to carry a body having a seating capacity of 30 passengers and will hold probably 30 more standing. Left hand drive is standard.

The motor is a special Continental, $4\frac{1}{2}$ by $5\frac{1}{2}$, equipped with special warming device and water syphon. The transmission is mounted amidship and has four forward speeds. The clutch is the multiple disc type with 13 discs.

The Selden full flexible frame is used with all units flexibly mounted. Steel wheels are standard with pneumatic cords 36 by six front and 40 by seven rear. Two gear ratios are furnished in both models. Where power is needed and less speed required, a $7\frac{3}{4}$ to one ratio is provided, giving a speed of 18 miles per hour. The standard chassis has a six to one ratio, giving a speed of 25 miles an hour.

The Selden motorbus makes a very attractive job and is equally as serviceable. The Selden method of mounting each member so that it will be held in line and yet permitted to move enough so as to absorb shocks and strains, is of particular value in the motorbus business. It provides additional cushioning and thus adds to the passengers' comfort, and also keeps repairs at a minimum by protecting the more delicate parts, through the absorption of the shocks and strains. This

means lower operating costs. The two units Nos. 31 and 51, are also particularly fitted for fire protection work and intercity haulage service.

The specifications are as follows:

SELDEN MOTORBUS UNIT NO. 31.

Capacity—Seated, 18 passengers; standing, 18 passengers; maximum passengers at one time, 36, seated and standing.

Chassis Weight—4000 pounds.

Body Weight Allowance—1600 pounds.

Speed—Geared for power, 18 miles per hour; geared for speed, 25 miles per hour.

Motor—Continental four-cylinder in bloc—"L" head— $4\frac{1}{2}$ bore by $5\frac{1}{4}$ stroke.

Horsepower—30.

Maximum Motor Speed—1200 revolutions per minute. Governor controlled.

Carburetor—Stromberg M-1.

Gas Control—Hand lever under steering wheel and foot accelerator.

Ignition—Waterproof high-tension magneto.

Radiator—Built-up type. Vertical tube with helical cooling fins. Non-binding trunnion suspension.

Clutch—Dry plate multiple disc completely enclosed; 11 plates.

Transmission—Selden-Brown-Lipe selective sliding gear type mounted on motor; four speeds forward and one reverse; nickel steel gears and chrome nickel steel shafts mounted on Timken bearings.

Gear Ratio—Geared for power; fourth, $7\frac{1}{2}$ -1; third, 13.5-1; second, 22-1; first,

41.5-1; reverse, 49-1; geared for speed; fourth, 6-1; third, 10.5-1; second, 17-1; first, 32-1; reverse, 38-1; 6-1 standard.

Drive—Spicer universal propeller shafts from transmission to rear axle.

Rear Axle—Worm drive, semi-floating type, mounted in scientifically constructed one-piece steel housing fully equipped with Timken roller bearings. Worm underslung.

Front Axle—Drop forged "I" beam—tie rods behind axle. Hubs and king bolt mounted on Timken bearings.

Springs—Semi-elliptic, front $2\frac{1}{4}$ inches wide by 40 inches long; rear, $2\frac{1}{2}$ inches wide by 52 inches long; 10 leaves front, 12 leaves rear.

Radius Rods—Heavy flexible pressed steel rods.

Frame—Heavy pressed steel; frame section, $3\frac{1}{4}$ inches wide by $5\frac{1}{4}$ inches deep; $\frac{1}{4}$ -inch thick. Special frame stock.

Steering Gear—Screw and nut type with 18-inch diameter steering wheel.

Control—Steering gear on left hand side with brake lever mounted on left frame rail and gear shift lever mounted on clutch housing.

Wheels—Malleable iron, with integral hubs.

Tires—34x5 front, 38x7 rear; pneumatics; Firestone and Goodyear standard equipment.

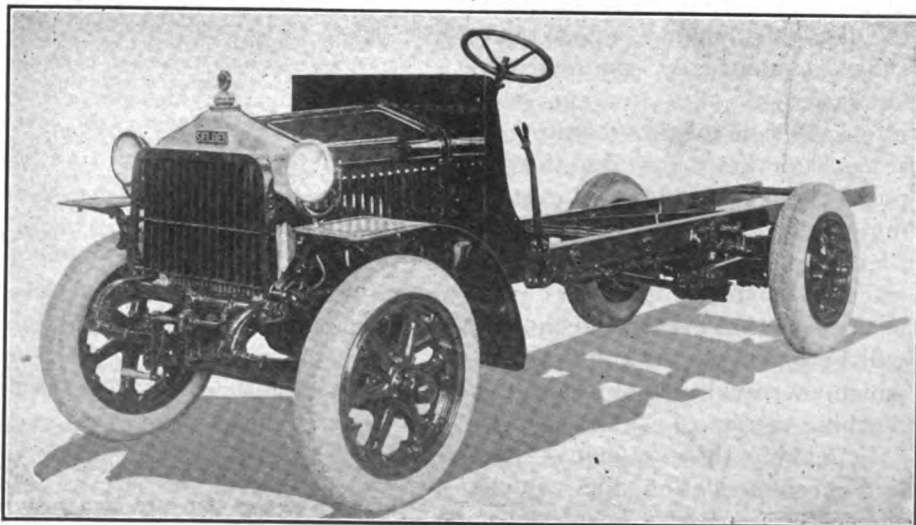
Wheelbase—147 inches.

Length of Frame Behind Dash—14 feet eight inches.

Tread—Front, 58 inches; rear, 58 inches.

Gasoline Tank—20-gallon heavy truck tank furnished.

(Continued on Page 102.)



This Strongly Built Bus Unit Also Is Suitable for Fire Protection Work.

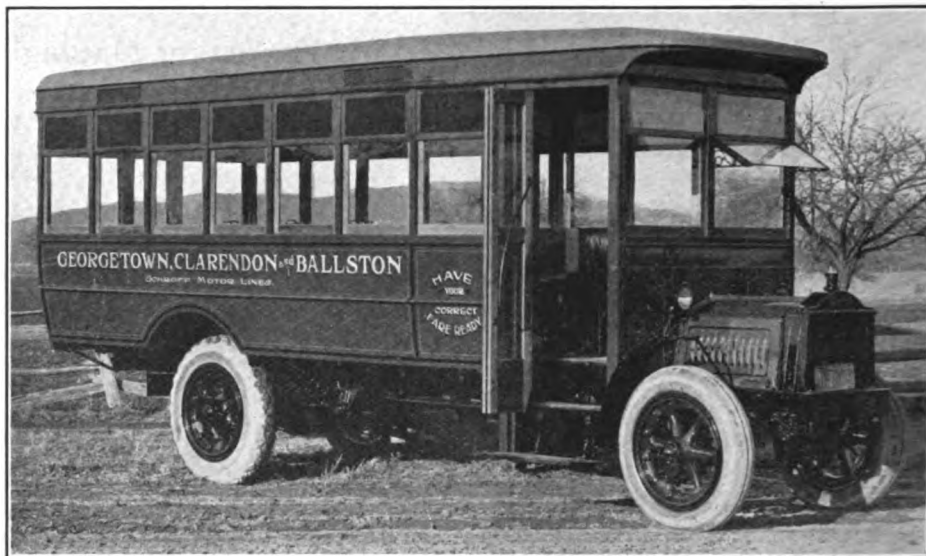
Hopkins Bus Body

THE Schroff Motor Lines, Washington, D. C., has recently put into operation a bus built to the order of that company by the Hopkins Manufacturing Co., Hanover, Pa. The body is 18 feet nine inches long from the dash and seven feet wide outside and is arranged with cross seats, upholstered in imitation leather, the seats being 32 inches long, allowing an aisle space of 15 inches.

THE sash is arranged to raise and when up to the highest point clears the seated passenger line of vision. The aisle is arranged with floor strips following out street car practise and the inside of the roof is lined with agasote, finished in white enamel.

The interior of the body is equipped with dome lights and push buttons on each post. Instead of installing curtains the upper sash is

glazed with dark green opaque glass, which deflects the sun's rays.



The Hopkins Bus Body Mounted on Packard Chassis. Note Ample Head Room.

There is a full height emergency door at the rear and above this door there is a good sized red glass which acts as a danger signal at night

when the lights are turned on in the bus.

The body weighs 3000 pounds and the panels are of 18 gauge Stretcher leveled automobile body metal.

RECOMMENDS BUSSES.

Fielder Sanders, traction commissioner of Cleveland, in his official report to the city council recommends that automobile bus lines with a fare rate fixed by the council be operated in the congested downtown areas by the local traction company, believing that such action would result in speeding passenger transportation, thereby relieving the frequently congested condition of the streets at certain periods of the day. Mr. Sanders, whose report shows an unusually comprehensive knowledge of the situation, went into specific details in presenting his reasons for the belief that the proposed change would have far-reaching results and, despite the fact that Cleveland has an admittedly fine traction system, there is every probability that his recommendation will be given serious consideration, which eventually may have far-reaching results.

In making this—to many—startling recommendation, the commissioner was merely keeping pace with the progress made in solving

traction problems in several other cities of this country, say automotive students who have been giving the possibilities of motor bus service in city passenger transportation careful study. Eventual developments will be watched with interest.

(Continued from Page 101.)

Equipment—Electric generator and starter; two electric head lights and one tail light; two oil side lamps; jack; set of tools; electrical horn; odometer; motometer; Alemite grease gun.

Finish—Primed in lead or painted in Selden red touched off with black.

SELDEN MOTORBUS, UNIT NO. 51.

Capacity—Seated, 30 passengers; standing, 30 passengers. Maximum passengers at one time, 60, seated and standing.

Chassis Weight—5650 pounds.

Body Weight Allowance—2000 pounds.

Speed—Geared for power, 18 miles per hour; geared for speed, 25 miles per hour.

Motor—Continental, four-cylinder in pairs; "L" head; 4½ bore by 5½ stroke. Horsepower—40.

Maximum Motor Speed—1200 revolutions per minute. Governor controlled.

Carburetor—Stromberg M-2.

Gas Control—Hand lever under steering wheel and foot accelerator.

Ignition—Waterproof high-tension magnet.

Radiator—Built-up type. Vertical tube with helical cooling fins. Non-binding trunnion suspension.

Clutch—Dry plate multiple disc, completely enclosed; 13 plates.

Transmission—Selden-Brown-Lipe selective sliding gear type mounted amidship; four speeds forward and one reverse; nickel steel gears and chrome nickel steel shafts mounted on Timken bearings.

Gear Ratio—Geared for power; fourth, 7½-1; third, 13.5-1; second, 22-1; first, 41.5-1; reverse, 49-1; geared for speed; fourth, 6-1; third, 10.5-1; second, 17-1; first, 32-1; reverse, 37.5-1; 6-1 standard.

Drive—Spicer universal propeller shafts from clutch to transmission and transmission to rear axle.

Rear Axle—Worm drive full floating type mounted in scientifically constructed one-piece steel housing, fully equipped with Timken roller bearings.

Front Axle—Drop forged "I" beam—tie rods behind axle. Hubs and king bolt mounted on Timken bearings.

Springs—Semi-elliptic; front, 2½ inches wide by 40 inches long; rear, three inches wide by 54 inches long; 9 leaves front; 14 leaves rear.

Radius Rods—Heavy flexible pressed steel rods.

Frame—Heavy pressed steel. Frame section 2¾ inches wide by 6½ inches deep; ¼-inch thick. Special frame stock.

Steering Gear—Semi-reversible heavy worm and sector type; 20-inch steering wheel.

Control—Steering gear on left hand side with brake lever mounted on left frame rail and gear shift lever mounted on clutch housing.

Wheels—Electric furnace cast steel with integral hubs.

Tires—36 by six front, 40 by eight rear, pneumatic; Firestone and Goodyear standard equipment.

Wheelbase—179¼ inches.

Length of Frame Behind Dash—17 feet five inches.

Tread—Front, 58½ inches; rear, 58½ inches.

Gasoline Tank—30-gallon heavy truck tank furnished. This is not mounted on truck. Gasoline line must be supplied by body builder.

Equipment—Electric generator and starter; two electric head lights and one tail light; two oil side lamps; jack; set of tools; electrical horn; odometer; motometer; Alemite grease gun.

Finish—Primed in lead, or painted in Selden red touched off with black.



“WHY will a fairly intelligent citizen pay good money for an old ruin of a truck that was middle aged when P. D. Lion discovered the fountain of truth, or whatever it was he did to get into the public prints of that time?” asked O. M. Vett abruptly as he swept a pile of papers from a convenient chair and motioned for me to be seated.

“You tell me why—also what prompted the remark,” I invited, offering the expected cigar.

“Wait ’til I get this piece of carpet lit and I will,” grunted Vett drawing through the cigar in the exaggerated manner he always affected when smoking one of my gift cigars. “This here weed is about the poorest one you’ve gave me yet,” he commented in an aside, “—but what I meant by my remark was this; I just lost a sale of a rebuilt truck because I asked more money for it than the fellow across the way did for an old wreck that he took in trade and didn’t so much as put a wrench to.

“My machine was a guaranteed proposition, but this customer—a little fellow who hasn’t been in this country long—went and bought the rattletrap and figured, I suppose, that he saved a couple of hundred. He’s a lot like all of the Foolish Farmer’s progeny,” finished Vett, disgustedly, tearing a bit of wrapper from the cigar.

“That sounds interesting,” I said. “Who was the Foolish Farmer and what did he do? The farmers I know are mighty keen business men.”

“Same here,” admitted Vett, “but this one I speak of was an exception. I’ll relate just one incident about him and you can draw your own conclusion—also your own moral. It seems that the old fellow

bought a pig one day for \$5. He kept it all summer and sold it in the fall for \$4.50. One of the neighbors, hearing of the transaction, asked him how he figured to get along if he did business that way.

“‘You spent \$5 for the pig in the first place,’ says this neighbor, ‘fed it all summer and then sold it for 50 cents less than it originally cost you.’

“‘Yes,’ agreed the farmer. ‘I did just as you say, but you forget the main part of the bargain.’

“‘What’s that?’ asked the neighbor.

“‘That’s the point,’ laughed the other slyly, ‘—I had the use of the pig all summer—that’s where I win out.’

“And in like and similar manner,” concluded Vett, “that’s the way a lot of buyers seem to be figuring when it comes to purchasing used trucks. Am I right?” he asked.

“You are,” I said.

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trolley company raised the fare and the bus owners did not.

“Thus all things were for a time equal and the bus, if it were not a more convenient and better means of transportation, would have disappeared. Instead the business grew. There is now no doubt but, except for the stringent limitations imposed by the Legislature in regard to placing more busses in operation, that they would be carrying a larger portion of the daily riders than the trolley company.

“The advantage of the bus over the trolley and the reasons for their success in Camden are five-fold. First, they are speedier. Second, they are immune from tie-ups, because of weather, or breakage. Third, they are cheaper. Fourth, and perhaps most important, they try to serve the public from the standpoint of their riders’ convenience. Fifth, being individually owned, there is no large overhead connected with their operation, as is the case with the trolley company.

“The disadvantages have been: First, lack of sufficient seating accommodations, and second, lack of conveniences, such as heating ap-

paratus and ready exits, although I am given to understand that the latest type busses are modernized.

“The matter of greater speed is in part due to the fact that when one bus on a line stops to discharge passengers it does not hold up all those behind it as is the case with a trolley. In some instances the busses can take a more direct and shorter route than a trolley. The matter of tie ups is also important. One single bus may break down, of course, but the passengers can transfer to another bus and continue the journey. A breakdown on a trolley line stops all travel on that line until it is remedied.

“Now applying the principles enumerated above to the conditions on the Roosevelt boulevard we would find that the first, speed, and the second, immunity from tie ups, would naturally be effective. The third would depend upon the organization or individuals operating a boulevard bus company. It is not probable that the fare would exceed that charged by the Philadelphia Rapid Transit for a similar distance however. The fourth and fifth advantages would also depend upon the organization operating such a line. The disadvantages could both be eliminated by the installation of large comfortable busses of the type in use on Fifth avenue, New York.

“In Philadelphia, however, still other advantages would follow, such as providing a direct service not now provided by the trolley company and the keeping beautiful of a magnificent boulevard by not allowing tracks or wires to be laid or strung.

“In stormy weather the bus has demonstrated in Camden that it is superior to the trolley. In the storm of Jan. 29 last practically all of the busses kept running continuously while, for 18 hours both trolleys and trains were practically at a standstill.

“So that in face of the admitted advantages such as have been demonstrated by busses in Camden and with the only objections easily removed at the outset, there is no reason why bus lines should not be put into operation on thoroughfares not served by trolley lines.”

Makes Substantial Profits

Milwaukee Owner Tells How Sight-Seeing Atterbury Gets Pick of Excursion Business, Clearing \$8000 a Year on 5 Months' Operation.

"RUNNING a sight-seeing bus is a profitable business, if you have a good bus and run it properly," says Charles L. Cook of the Charles L. Cook Bus Co., 1905 Walnut street, Milwaukee. "Because there is money in the business there is a lot of competition. One of the main things is to get the jump on your competitors.

"THIS requires a dependable chassis and an attractive and comfortable body. On July 1, 1920, I purchased a 2½-ton Atterbury chassis with a long wheelbase. I chose the Atterbury because I was already operating two Atterburys with dump bodies, and knew that the truck was right. I designed a body myself and had it approved by the Atterbury people before I had it built.

"Every afternoon, including Sunday, the bus meets the Goodrich boat when it comes in from Chicago. Shortly after the boat is docked my bus is loaded to capacity. My bus is always loaded and on its way long before any of the other busses are half full. It takes a little over an hour for the bus to cover the sights of Milwaukee and return to its starting place, having travelled 16 or 17 miles. In addition to the passengers obtained from the steamboat, there are usually enough other visitors in Milwaukee to fill the bus for two more trips a day.

"I average a full load of 28 passengers. As each passenger pays \$1 the Atterbury takes in a total of \$28 a trip, or \$84 for the three trips made each day. The sight-seeing bus business in Milwaukee is good for about five months in the year, making my total income \$12,600. If I lay the truck up during the winter the annual cost of operation would be \$4273.96, which would

make my net profit \$8326.04 for only five months' work.

"It seems to me, however, that it is poor business to allow a \$7856 investment to stand idle for seven months in the year, and I am figuring a way to keep the truck busy all winter. In a city the size of Milwaukee, with a population of 525,000, there are between 25 and 30 funerals each day. My bus is so well known for its appearance and comfort that I figure I can get at least three funerals every day. With 28 passengers each time at \$1 apiece the truck would be earning \$84 a day the year round.

"On this basis my total operating cost would be \$24.26 a day, allowing for a run of 50 miles per day, as in sight-seeing bus work. However, the daily mileage in funeral work would probably be considerably less, and this would increase the profit. But even if the Atterbury did run 50 miles per day, my profit would be \$59.74 a day, or about \$18,220 a year.

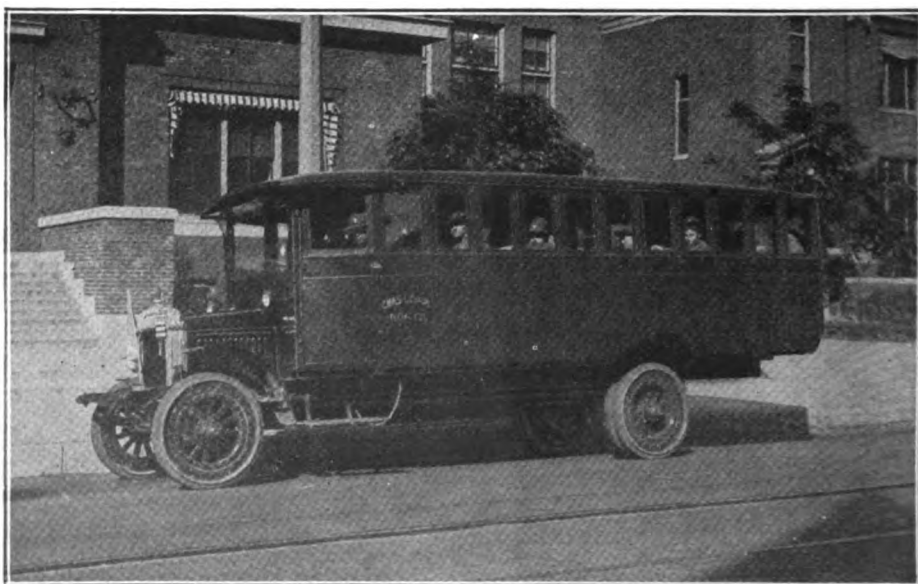
"At present I figure my expenses and profit as follows:

OPERATION RECORDS.

Period covered 6 weeks to Aug. 13, 1920.	
Age of truck at start of period.....	New
Number of days operated.....	44
Number of round trips.....	132
Total units (passengers) carried.....	3696
Total miles travelled.....	2200
Average miles travelled per day.....	50
Total units (passengers) miles.....	61,600
Miles per gal. of gasoline.....	7
Miles per gal. of cylinder oil.....	100
Est. min. mileage life of truck.....	55,000
Estimated mileage life of tires.....	14,000

COST RECORDS.

Chassis	\$3,700.00
Body	3,700.00
Freight and tax.....	456.00
Total investment.....	7,856.00
Interest on investment.....	314.24
Taxes	175.00
License	45.00
Administrative overhead.....	730.00
Garage	192.00
Insurance	260.00
Total fixed expense per year....	1,716.24
Depreciation per mile.....	.1381
Est. Mtnce and repair per mile..	.0274
Tire cost per mile.....	.0187
Gasoline cost per mile.....	.0414
Cyl. oil cost per mile.....	.0072
Total variable exp. per mile....	.2328
Total fixed exp. per mile.....	.0900
Total driver's wages per mile....	.1142
Total cost per mile.....	.4370
Variable exp. for 50 miles.....	11.6400
Fixed exp. per day.....	4.5006
Driver's wages per day.....	5.7100
Total cost per day.....	21.8506
Cost per unit (passenger).....	.2601
Cost per unit (passenger) mile..	.0156



Total Yearly Income from This Atterbury Bus Is Stated to Be Close to \$13,000, of Which More Than \$8000 Is Reckoned as Net Profit.

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that the requirements call for this service.

Suggested Procedure.

We have adopted the following general procedure in connection with the carrying out of general overhauls:

(1) A sheet is posted in each garage showing cumulative daily mileage of each bus from the last overhaul; from this sheet it is possible to see at a glance which vehicles are due for general overhaul.

(2) The day previous to general overhaul each vehicle receives a special examination on the road by a qualified inspector; reports of this inspector are attached to general overhaul sheets. A special form is provided for this and on it are printed the items inspectors are required to examine.

(3) At night as the buses are turned in a specially trained mechanical inspector meets them at the garage entrance. The drivers hand their report cards to this inspector and at the time take up with him any matters that seem of more than ordinary importance.

(4) The night previous to the general overhaul the mechanism is thoroughly cleaned. The bus is then placed over a pit ready for an organized attack on the following morning.

(5) The general overhaul sheet, which represents the history of a bus since its preceding general overhaul, is withdrawn from its binder, totaled up and placed on a board hung at front end of the bus. This sheet shows the drivers' names, mileage, gas and oil consumption; also the defects reported each day since the last general overhaul. There is also entered on the sheet a comparison of the gas and oil averages of the vehicle as compared with the other vehicles operating from that division. The general overhaul sheet for each bus is brought up to date daily. The necessary data are obtained from the con-

ductor's day card, the driver's report card and the division gas chart. The last item is described below.

(6) During the process of general overhaul, gangs of specially trained experts deal with the various units. There is printed on each general overhaul sheet a summary of the duties of each section, the parts to be inspected, etc. This process is followed rigidly without any regard for the apparent condition of the vehicle. Details of the defects, if any, are obtained from the daily report card (which is carried on each bus. The drivers are required to enter chassis defects and the conductors all matters pertaining to the body.

Gasoline Consumption.

Throughout the year we average about 6.5 miles per gallon of gasoline. This figure takes into account all shrinkages, leakages and losses of every kind and description. There are a very large number of high individual averages, some as high as 15 miles per gallon. We have a number of men who can give us 10 miles per gallon for weeks at a time. Of course, there are other men who give us low averages, but this is to some extent controlled by the class of service; for example, buses doing short mileage during the congested period of the day only are seldom high on our lists.

There are many reasons why we believe it is essential that special care and attention be paid to the matter of fuel economy. High gasoline averages from our standpoint mean economy, well-designed and maintained equipment, skilled and contented operators.

High Average Maintenance.

Where high averages are obtained there can be no question that both drivers and conductors are willing and anxious to serve the best interests of the business, and one knows that this cannot be the case unless they are interested in their work and are happy and contented.

The following ways and means have been adopted to secure and also to maintain high averages:

(1) All engines are put through a standard dynamometer test before being issued to the repair and manufacturing departments. After engines are installed few, if any, adjustments are found necessary other than the changing of jets.

(2) There is posted in a prominent position in each garage a sheet which shows daily the number of miles per gallon of gasoline for each vehicle. This sheet is constantly referred to by members of both mechanical and transportation departments. This information gives us a definite basis on which to work and it also permits all concerned to be in a position to see the results of their efforts.

(3) There is attached to each division one fuel expert and one driver who is not assigned to any definite run. The latter's work consists in taking out and operating in regular service buses showing low averages. His assignment is arranged between the fuel expert and the transportation foreman. We choose the most efficient of our drivers for this work. Obviously, the advice of such men is of the greatest possible value to the fuel expert.

(4) The fuel expert is provided with a special kit of tools together with an assortment of various jets. No carburetor adjustments are made by men other than the fuel experts. All jets are numbered and carefully calibrated and a proper record is made of all jet changes. The carburetor itself is specially built to give high economy.

(5) From time to time we organize various kinds of gasoline contests. In some instances, details of these contests have been published in the trade papers. These contests are useful not only because of the direct bearing they have on our gasoline and repair bills and mechanical efficiency generally, but also because they tend to create better fellowship, a friendly spirit of rivalry, a keener and deeper in-

terest in our business and a closer understanding of our aims and aspirations, in short, our policy.

- (6) There is issued to the various departmental heads a weekly summary showing divisional gasoline averages. Comparisons are made with the previous week and also with the corresponding period of the previous year.

Repair Department.

Briefly, the repair department is responsible for the carrying out of our annual overhaul program, the supply of properly repaired units to the operating departments, and in addition it undertakes major repairs to bodies and chassis due to accidents, etc. Fortunately, however, these are infrequent.

Centralized Unit Repairs.

We believe in centralized unit repairs. This work is carried out in a department entirely separated from the operation end. To permit this, each operating department is allotted a definite percentage of spare units which from time to time are exchanged. In so far as possible, the exchange is made on a mileage basis and we insist that the units are delivered and returned complete in all respects. Operating departments are neither expected nor permitted to make major repairs to units.

Its Advantages.

The centralization of our unit repairs permits of the use of unskilled labor, and to this end special tools and labor-saving devices have been developed to an unusual degree. Also men are concentrated on each of the various sections and each section has allotted to it complete tool equipment covering its requirements. Engines in particular receive careful attention. Bearings are reamed, not scraped. After overhaul the engines are run in by belt, then lightly under their own power. Finally, they are transferred to a dynamometer where they are adjusted to prearranged standards.

Every twelve months each vehicle is automatically withdrawn from service. It is then stripped down completely and rebuilt. At this time

improvements suggested by the research department after having been approved are embodied. The complete bus is rebuilt and repainted, then returned to the respective operating department, to all intents and purposes a new machine and in many respects a better one than the original design. This procedure, of course, has no small bearing on the matter of depreciation, for under these conditions depreciation is really governed by obsolescence.

Research Department.

This department co-ordinates the work of the design, repair and operating departments.* Briefly, the duties and responsibilities of the research department are as follows:

- (1) Analysis and recording of all breakages, failures, etc.
- (2) Operation of the dynamometer.
- (3) Continual study of the fuel situation.
- (4) Testing of materials such as fuels, oils, etc.
- (5) Perusal of all trade journals.
- (6) Standardization program.

As regards the analysis and recording of all breakages, failures, etc., we attach great importance to this matter. The data is tabulated in such a manner that accurate comparisons can be made. Standardized classification sheets are furnished departmental heads weekly. Operating and repair departments are required to forward all broken parts to the research department, where full and complete records are maintained.

Among other apparatus the research department has a 150 hp. Sprague dynamometer. This is employed for the testing out of all engines, either new or repaired. Of course, it is also employed on work of other kinds.

Fuel Studies.

A large amount of research work is done in connection with the continual study of the fuel situation. Various kinds of mechanical and chemical gas-saving devices and compounds are constantly under tests, as well as thermostatic controls for air and water, carburetor improvements, etc. Our dynamometer equipment permits us to determine

the value of these devices speedily. Where merit is shown, further tests are continued on the road under the actual service conditions.

The testing of materials such as fuels, oils, etc., requires scarcely any comment. Obviously, it is necessary to assure ourselves from time to time that the materials delivered are in accordance with the specifications; for example, that the oils possess the required physical properties, that the gasoline is free from impurities, acidity, etc., that the range of boiling points is reasonably satisfactory, that our rubber tires possess the required resiliency, etc.

Research Data Applications.

The research department is the medium through which we keep posted in regard to all developments in the industry. All trade journals are carefully scanned with this in view. Frequently small tools, methods of doing work and improvements of one kind or another are found in this manner that might otherwise be missed.

Where improvements are tested and show definite merit, it is the duty of the research department to make recommendations in regard to the embodying of these improvements in our equipment. This is done during the annual overhaul process. This department is also required to find remedies for defects which prevent our vehicles from operating their allotted mileage between general overhauls. Such improvements are also usually embodied during the annual overhaul process, although occasionally we standardize and apply certain minor features at other times.

Our system of records is very complete. Comprehensive data is kept showing the results obtained from the use of practically every device of any consequence that we have ever built or tested. We make use of photographs wherever it is possible to do so; for example, we photograph our jigs, tools, patterns and our parts grouped under the various sections for use of both stores and mechanics. We obtain invaluable information from the data gathered in connection with service failures.

Transportation Department.

The superintendent of transportation has charge of selecting all men for:

- (1) Transportation department.
- (2) Training supervision.
- (3) Discipline administration.
- (4) Promotion.
- (5) Traffic study.
- (6) Supervision of inspectional forces.
- (7) Receivers.
- (8) Timekeepers.
- (9) Division foremen.

Work of Employment Bureau.

The chief of the appointment bureau is responsible for all men employed. Generally, employees recommend applicants. Qualifications are preferably married men, 25 years or over, and those with army or navy training. Applicants must be over a specified weight and height. All applicants are courteously received by an examiner who questions them as to their previous experience. Those who qualify are permitted to fill out applications. They are then passed on to the chief, who questions them further as to their general qualifications and knowledge of the city. If accepted, the applicants are sent to the company doctor for physical examination and eye sight test. The superintendent of transportation then gives each applicant a short lecture on the policies and aims of the company. His photograph is taken by the company photographer and he enters the conductors' instruction school. His references for five years are in the meantime investigated and those references within 25 miles of New York city are checked up by a personal investigation. Only 20 per cent. of all applicants qualify for the position of conductor.

As a matter of fact, we prefer to train men for drivers who have never had automobile driving experience. Furthermore, we find that railroad operatives, while they do possess useful knowledge, require to unlearn so much that on the whole it is more satisfactory to employ men without this experience.

We also aim to pay at least as good, preferably better, wages than can be obtained in business of a

similar class. Our working conditions are just as good as we know how to make them. The net result is that labor troubles are conspicuous by their absence. Lastly, our labor turnover is small and we always have more applications for positions than we have positions to offer.

Conductor Training.

The chief conductor instructor points out to students the duties they are required to perform, emphasizing courtesy toward passengers and the prevention of accidents. Each student is then given various forms and descriptive matter and instruction in detail on these follow. Students are assigned to conductor instructors on the road to receive a practical working knowledge, and then return to the school for a final examination. Those passing the oral, blackboard and written examinations with a proficiency of 75 per cent. are recommended for appointment. Others receive further instructions until 75 per cent. proficient. On an average, the instructional period covers four days. On the completion of the instructional period the student is given a certificate by the chief conductor instructor which he brings to the appointment bureau. Assuming satisfactory references, the student is then outfitted by the company tailor. Finally he is assigned to a division where a "get together" talk is given by the foreman before starting work. All new men are on probation for 90 days, during which time the chief conductor instructor rides with them as often as practicable for follow-up instruction, because it is impossible to inculcate all details of a conductor's position while in the school.

Promotional Basis.

The men who man our buses, including instructors, inspectors, starters, etc., must all graduate from positions as conductors. Where men prefer to remain as conductors, no objection is raised. Based on averages, each conductor has an opportunity to become a driver after eight months' service. We attach great importance to the educational value of this system. A conductor soon learns traffic regulations. He be-

comes familiar with the requirements of our patrons. He also has the best possible opportunity to see and feel the results of mis-operation. A driver without a conductor's experience can scarcely realize what a conductor must contend with and he would be less likely to cooperate with the conductor. His experience as a conductor insures that he is aware at almost all times of exactly what is happening at the rear end.

Promotion to driver, which involves an increase in pay of 13 per cent., is determined by seniority. Promotion also depends upon the man's record while employed as a conductor. This prompts conductors to keep their records clear of violations. Conductors are recommended for promotion by their foremen and re-examined by the doctor. If passed the records are examined by a board of review consisting of the superintendent of transportation, the chief driver instructor and the chief conductor instructor. If approved by the board, they are placed in the driver's instruction school.

Driving Instruction.

The chief driver instructor points out to the students the duties they are required to perform. They are then shown on a stripped chassis the various units and the relation these units bear to the operation of the bus. Then they are sent to a divisional instructor and receive practical experience in driving on the road without passengers. Every third day the students are sent back to the school to receive additional mechanical instruction.

Upon passing the state examination and a license being granted, the student is permitted to drive a bus carrying passengers, under guidance of the service instructor until competent to become a driver. He is then given a test by the chief driver instructor and if found satisfactory is recommended for appointment and assigned to a position as a driver.

On an average the instructional period covers 16 days of 10 hours, the 160 hours being divided into 45 hours of mechanical instruction, the same amount of driving instruction without passengers, and 70 hours of

driving instruction with passengers. As in the conductor's instruction, follow-up instruction is also given. From the time each man files his application for a position as a conductor to the time he is made a driver, the company expends practically \$200 for his instruction.

Personnel Records.

Complete records are kept of each man. These are in folder form and consist of:

- (1) Application.
- (2) Reference blanks.
- (3) Photographs.
- (4) Doctor's examination certificate.
- (5) Complaints and commendations.
- (6) Violations.
- (7) Accident settlements.

The first part of the record consists of sheets arranged in chronological order showing entries of all violations, complaints, commendations, accidents, etc. When a conductor becomes a driver, the same record is continued and there is attached thereto his record of instruction as a driver, the doctor's re-examination certificate and the employee's contract; also a sheet showing entries of all delays together with reports covering their investigation.

In the instruction period students are paid. This is in reality a loan and a contract is made in which it is stipulated that if the student remains as driver six months or longer, the loan is discounted. If he leaves the service prior to expiration of the six months' period, the loan must be paid out of any wages due him.

Time-Table Preparations.

Buses are run in accordance with time-tables very similar to those of any steam railroad. The construction of our time-tables is a most difficult and expensive matter, much more so than with steam railroads and electric surface or subway systems. Because of the varying traffic conditions along our routes, we are obliged to have no less than six different running times. Of course these are based on average conditions, since it would be impracticable to meet every variation. Any

simplification of our time table arrangements must immediately result in a decreased speed. This would be unsatisfactory to the public and immensely costly to us. Our annual pay roll for drivers and conductors is in round figures \$1,000,000; therefore a one per cent. decrease in speed represents \$10,000 added to our wage expense. There are also changes in the different periods of the year and it is necessary to build new schedules when these become effective. Schedules must also be changed to take care of the varying conditions of riding. This change in riding must be watched and passenger counts are constantly taken to determine just what service is necessary. Altogether there are 10 time table

THERE are nine separate lines, all of which converge on Fifth avenue below Fifty-seventh street. For the different periods of the day we at present operate the following number of buses per hour:

Period	Buses Per. Hr.	Headway, Sec.
Morning rush...	193	18
Midday	107	33
Evening rush...	184	20
Sunday	144	25

changes throughout the year and modifications almost weekly.

Route Patrol.

Foremen, chief instructors, inspectors and starters patrol the routes for the purpose of regulating the operation of the buses and to give follow-up instruction to new conductors and drivers. We also employ an average of 20 operatives, in civilian clothes, in our inspection bureau to check general operations on the road. Inspectors also make hourly checks of schedules, report bad pavement conditions and defective equipment, check conductors' register readings and talk to the men on minor violations. Serious infractions of rules are reported to the respective foremen of transportation. They in turn give a man

four chances before sending him to the superintendent of transportation. We have instituted the "right of appeal" so that a man who feels an injustice has been done can take his case to the general manager and, if necessary, to the president.

Crews are allowed 10 minutes each morning and night for an inspection of their buses. The depot dispatcher is responsible for seeing that the buses leave the garage on schedule time. As soon as a bus reaches the terminal it is under the direction of the starters and the inspectors who direct the buses in accordance with schedules, copies of which they are provided with in small book form.

Emergency Routing.

Arrangements must always be made ahead of time for the numerous parades traversing our routes. New routes must be selected and looked over for overhead structures, pavement conditions, etc., and men have to be stationed at the points where we turn off our regular routes and also those unprotected by traffic policemen, as well as at points where there are overhead obstructions. While parades do cause us considerable losses, they do not prevent our operation, since it is simply a question of selecting other routes. Our organization provides for a number of alternative routes which have been previously surveyed and the points established where men are required for directional purposes, etc. This is a very convenient arrangement and permits of changes being made on very short notice.

Snow Provisions.

We maintain a fleet of 38 snow plows and five sand cars, with which we keep our routes open through the winter. The snow fighting force is patterned after the fire department. Each section of our routes has its allotted plows in charge of a captain. Our organization is arranged so that regardless of the time of day or night a snowstorm starts, the required men automatically report for duty. When such conditions obtain, a complete system of centralized control automatically becomes effective.

Employee Benefits.

We have an association for all employees which insures them for a nominal fee with death and sick benefits; also the free use of the company's doctor. We have a "sunshine" nurse and "sunshine" committee who takes care of those who are ill or in trouble. In addition, we maintain a pension fund. We often give free legal advice through our attorneys to employees. Restaurants, recreation rooms, barber and tailor shops are maintained for our employees at each of our garages. We even provide sleeping accommodation in the winter for men who cannot get home because of unfavorable weather conditions so that a man can practically live at the plant with all the various accommodations provided. In our restaurants food can be obtained at practically cost price. The same applies to our barber shop. The service of the tailors is gratis. We have a house organ, Bus Lines, to which employees contribute items of interest, and generally the business is run on the basis of one great big, happy family.

Fares.

No satisfactory motor-bus service can be given with seats for all on the basis of a five-cent fare. It costs the Fifth Avenue Coach Co. about 8½ cents for each passenger carried. A large proportion of our daily mileage is operated at a loss. Checks show us exactly where these losses occur, but we do not try to avoid them. We are satisfied that by careful management on the whole a profit can be made and that in the long run we should surely lose if we merely cut our service to suit local conditions. We know that our success must depend on the good-will of the public and it has always been our aim to give in exchange for our earnings an equivalent measure of helpful service.

Conclusion.**Reasons for Bus Installations.**

- (1) Very prompt installation.
- (2) Greater flexibility—non-paying routes can be abandoned; other routes can be lengthened to care for a city's growth and expansion.
- (3) Failure of one bus affects only that particular vehicle.

(4) Routes can be diverted in case of fire, parades or other obstruction.

(5) Provides cheap, healthful recreation.

(6) Will relieve overcrowding of street cars.

(7) Adaptable to summer resort service where traffic is very heavy in summer months and light in winter. Buses can be moved to city where traffic is heavier in winter.

(8) Very suitable for private hire and entertainment of city visitors; will advertise effectively all points of vantage in a city.

(9) Buses can be heated by exhaust gases without additional expense.

(10) The bus requires the minimum investment in garage and repair facilities.

(11) For extending the service of existing car lines by a bus system into the outlying districts through the introduction of transfer privileges between the two.

(12) Routes can be developed with buses at a much less initial expense than with trolley cars.

(13) Higher average rate of speed through congested areas, inasmuch as buses can pass each other, winding in and out of the traffic.

(Continued from Page 92.)

which is divided by a panel of micarta backed on the resistor side with fireproof material. The compartment containing the grid resistor is cooled by air passing in through the louvres at the front and downward and outward beneath the bus. The contractor side of the hood compartment is also ventilated with suitable provision made for guarding against the entrance of water and dust.

The scheme of control is very similar to that which has been in successful service for the past two years on the Third avenue railway in New York City. These 50 cars were purchased in July, 1919, and their performance has demonstrated that this scheme of control is well adapted for vehicles operating in city service through traffic of varying density.

New Development of Current Collector.

The current collector, or trolley, which will be furnished to the Toronto Transportation Commission, consists of a special single R. D. Nuttall base with a single-pole approximately 14 feet long at the head of which is a specially designed casting provided for the mounting of two separate arms of insulating material, each 24 inches long. These arms are connected to the pole head casting through a spiral spring approximately two inches in diameter and six inches long, permitting the arms to swing freely in any direction. Immediately beneath the spring are hinged steel rods so connected to the pole head casting and the casting supporting the tube which forms the arm, that the spring is in tension when the trolley is on the wire. This feature permits of only a slight deflection in the downward direction of the arm, but at the same time permits it to swing freely sidewise or to follow the vertical deviation of the trolley wire. At the end of the two insulating tubes are mounted ball bearing swivel harps of cast aluminum so designed that it is very difficult, if not impossible, for the trolley wire or cross suspension wire to become entangled in them.

The bus will be propelled by two Westinghouse type 508-A sleeve bearing railway motors of standard design with the exception of the shaft, which will have a tapered extension at either end so that the two motors will be interchangeable and either may be used in the front or rear position of the bus. The motors will be connected in tandem and mechanically secured to the drive with flexible couplings.

Tractor plows operating near Medan, Sumatra, are turning up twenty acres of ground in five hours, which, it is claimed, would have taken 100 coolies one working day to perform.

To meet the world supply of automobile tires, American manufacturers require 375,000,000 pounds of crude rubber each year.

The anti-burglar motor fleet of the police department in Pasadena, Cal., is equipped with wireles telephones, which enable officers to communicate with headquarters for reinforcements, if necessary, while pursuing motor bandits.

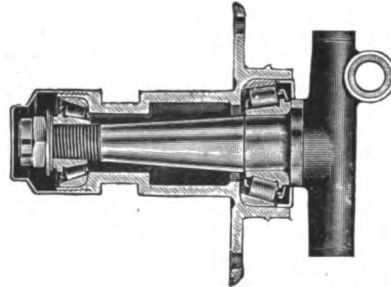
TRUCK AND BUS ACCESSORIES

Gemco Baf-Oil Plugs form combustion chambers into which the spark plugs are screwed in the usual manner. In each chamber are two baffle plates, which prevent the oil from reaching the firing points. Each plug is a unit in itself and has no mechanical contrivance to wear out or cause trouble. Oil is prevented from reaching the firing points and is not burnt into harmful carbon.

A priming feature is included in the $\frac{1}{2}$ -inch size, which adds materially to its usefulness in cold weather.

The baffle plates prevent the oil from reaching the firing points and become extremely hot when the motor is in operation and act as hot spots which completely vaporize the gas, states the manufacturer. When the spark occurs the

load and thrust with the result that there can be no binding either when travelling straight ahead on a level road, negotiating turns at high speed or by end thrust, often resulting from the nature of the road.



The cone and rollers are forged from high carbon chrome alloy steel bars slightly oversize, then heat treated and hardened in oil, giving a uniform hardness throughout. The roller separator is a high, carbon steel stamping of such design that the rollers are always held in correct positions and the bearings become self-aligning and are easily adjusted. The separator is complete in one piece, heavy enough to retain its form and holds the rollers in position on the cone even when the outer bearing cone is removed.

The drop forgings of high, carbon chrome alloy steel for the cone and outer ring are, after being thoroughly hardened, finished on micrometer grinders to mechanically perfect size and contour, thus giving a high finish of these vital parts which insures the maximum efficiency, it is stated, and the minimum of friction.

The rollers are interchangeable with the ball bearings supplied in Ford and Chevrolet front hubs without machining or modification of either bearings, hubs or axles.

Manufactured by **Fulton-Houston Co.**, 1146-50 S. Michigan Avenue, Chicago, Ill. Price, set of four for two wheels, \$10.

The **Gridley Piston and Piston Ring Machine** may be used with either belt or electric motor drive, the latter being recommended by the manufacturer as the speed may be varied to suit conditions of work. Namco self-opening dies are also recommended where speed is essential, the manufacturer stating that as threading is best accomplished by using the self-opening die, because of its strength, simplicity and positive opening action. The fixtures employed for opening die threading and tapping are simple in construction and springs are not used for returning the tool to its reoperative position.

Namco collapsing taps range in size from $\frac{7}{8}$ inch to $7\frac{1}{2}$ inches and cover prac-

governed by the classes of work done and the kind of machine to which the tap is applied.

The **Gridley single spindle automatic lathe** is completely equipped with the necessary tool holders, slides, forming tool holders, cutting off tool holder corner stop, complete outfit of cams for medium and coarse feeds, etc.

The **Namco self-opening die head** is an extra which is furnished on order, making the lathe and its attachments fully automatic.

Manufactured by the **National Acme Co.**, Cleveland, O. Prices and literature on request.

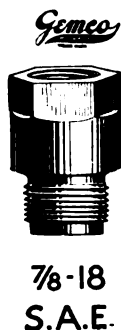
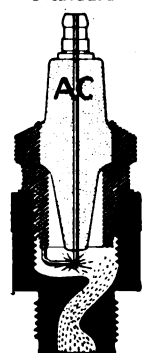
The **Wolter Auto Signal** is designed to protect the car and its occupants from accidents and collisions at all times and, more especially, when the car is curtailed or enclosed. This signal gives the driver of an approaching or following car detailed information of your intentions. If one intends to turn to the right the signal points upward; to the left, the signal



$\frac{1}{2}$ Inch Standard



PRIMING FEATURE



$\frac{7}{8}$ -18 S.A.E.

highly vaporized gas in the combustion chamber ignites and shoots into the cylinder proper, causing a clean explosion that increases the power of the motor and reduces carbon deposit.

The manufacturer states that there are more than 10,000,000 oil pumping cylinders that would be greatly benefited by the installation of the Baf-Oil plug.

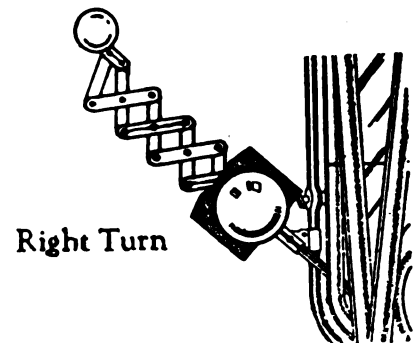
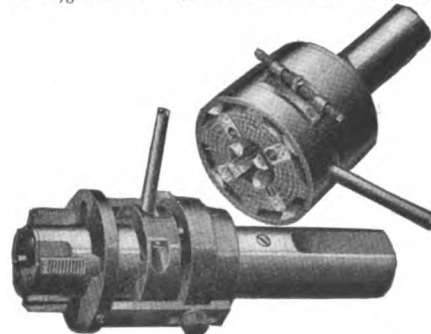
Manufactured by the **Gemco Manufacturing Co.**, Milwaukee, Wis. Price, $\frac{1}{2}$ inch standard, \$1; $\frac{7}{8}$ inch, \$1.25.

The **F. and H. Taper Roller Bearings** for Ford and Chevrolet front wheels are self-aligning, adjustable and permanent, the manufacturer states.

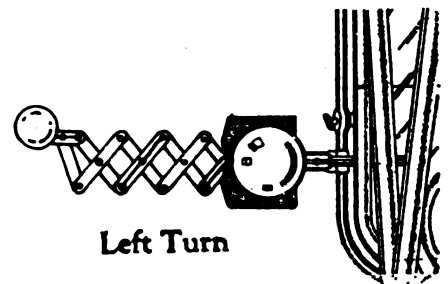
The efficiency of a taper roller bearing is largely due to the correctness of the taper and the angle of the several parts to properly distribute the load.

In the F. & H. roller bearing this problem has been worked out with mathematical accuracy. It is stated: Taper and center line of the rollers being designed to perfectly meet the requirements of

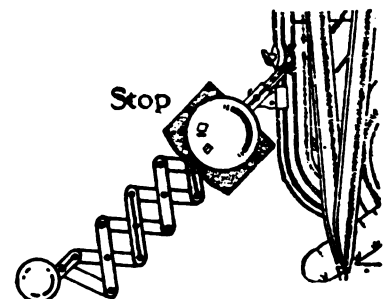
tically all needs of inside rethreading in the automotive industry, it is stated. Automatic taps are also made in the style known as the outside trip, which insures collapsing action at the required depth regardless of any irregularity in the chucking up of the work. The chief difference between the outside trip and the inside trip consists not in the principles of collapsing action of the trip proper, but rather in the exterior design, which is



Right Turn



Left Turn



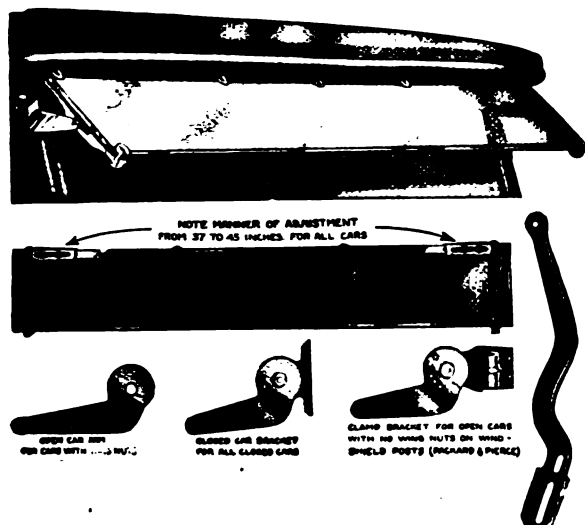
Stop

points to the left and if one intends to stop, the signal points downward. The signal, it is stated, is easily visible at all times at a distance of 150 to 200 feet. At night the signal is illuminated by a small electric bulb enclosed in the arm. A ratchet located six inches from the steering wheel operates the signal which is easily installed in a few minutes time by anyone handy with tools.

Manufactured by the **Wolter Auto Signal Co.**, 2800 Rucker Avenue, Everett, Wash.

The Brinck Storm and Sun Shield is designed to meet the demands of the dealer or jobber who wishes to stock the least number of sizes to fit all cars, as it is easily fitted to the windshields of all cars by means of simple adjustments which can be made in a few minutes time.

The Brinck storm and sun shield offers to drivers a perfect protection from sun, rain and snow and is claimed to be the final addition necessary in obtaining the maximum comfort and safety from the automobile. House transparent colored



glass forms the shield which is supported along the top and at the lower end by special brackets which prevent the glass from rattling.

The two side brackets are of cast aluminum, highly polished and are joined by a bar of mild steel, which makes a very rigid yet adjustable frame. The glass is of triple strength and may be had in blue, green or amber. It is held firmly in a bed of felt by five aluminum clamps. Each color is of the same efficiency, preventing all glare and allowing perfect vision when driving.

Manufactured by the Brinck Manufacturing Co., Moline, Ill. Price, \$18.

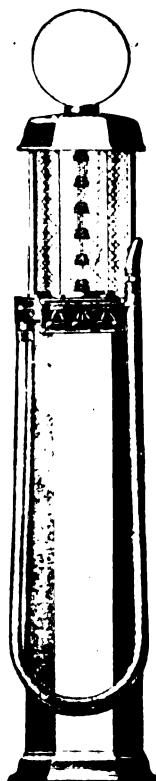
Milwaukee Visible and Rapid Delivery Carb gasoline pumps are designed to serve customers quickly and to show at a glance the amount of gasoline being filled into the customer's tank either by means of a visible filling bottle graduated in gallons or by means of an indicator facing the customer.

Two types of the visible pump are offered. Type 58B is equipped with the power pump located in the base, while type 58A is arranged so that the power pump may be located in an adjoining building. Type 361 Rapid Delivery five-gallon continuous motion speed pump is claimed to be able to handle 18 gallons a minute with slight effort. Slightly over 12 turns of the crank deliver five gallons while the plunger is returned by two revolutions. Adjustable measuring stops mounted on ball bearing guide, enable the operator to draw accurately one, two, three, four or five gallons at a single stroke.

Considering the unusual speed, very little effort is necessary to run the operating crank. All operating parts are completely enclosed, protected from dust and weather at all times. To operate, it is only necessary to unlock machine and insert handle. The parts are easily accessible through opening two lockable doors which expose the mechanism.

In the visible type a specially designed rotary gasoline pump is installed in the base of the dispenser, which is operated by an electric motor encased in a steel jacket, making it impervious to gasoline vapors. For those who prefer this type

of pump the visible type offers a unit which has passed through the experimental stage and has been pronounced



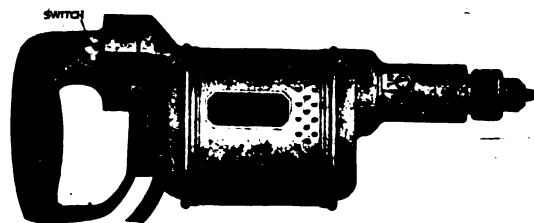
thoroughly practical, and carries the seal of approval of the Underwriters' Laboratories.



Manufactured by the Milwaukee Tank Works, Inc., Milwaukee, Wis. Prices and literature on request.

The Cincinnati Electric Drill is a light weight portable tool designed for garage and service station uses and has a capacity of 3/16 inch. This is the latest addition to the Cincinnati line of electric drills and grinders and is manufactured to meet the need for a light and frictionless, high-speed, powerful tool that is

adapted to all kinds of drilling. It is suitable for drilling in steel, brass, aluminum and sheet metal and for automobile body work, car building, window frames and wood boring.



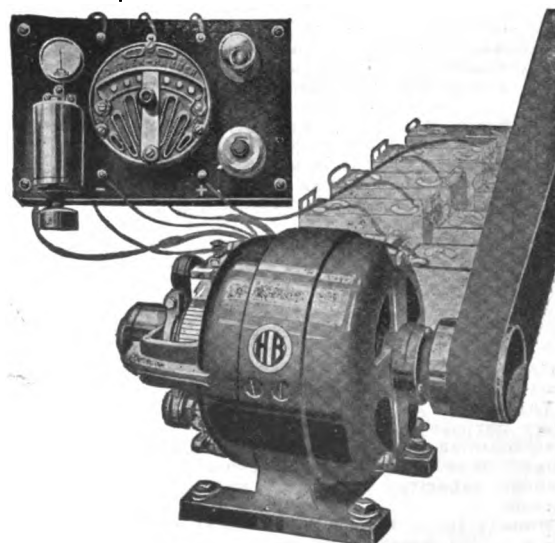
While thoroughly simple in construction, the new drill is compactly and substantially built. It is equipped with Universal Motor, for use on direct and alternating current of the same voltage. The motor housing, end caps and handle are made of special strength aluminum, insuring minimum weight. The armature and gear studs are mounted on ball bearings which practically eliminate all friction. Gears are of special analysis high grade steel. The switch is the "Cincinnati" special quick make-and-break type with 50 per cent. overload allowance. It is entirely enclosed in the handle and is operated by a trigger conveniently located in the handle.

In addition to the new drill the company makes a complete line of portable electric hand and heavy duty drills, bench, floor, aerial and tool post grinders and buffers.

Manufactured by the Cincinnati Electrical Tool Co., Cincinnati, O. Prices and literature on request.

The HB Independent Lighting and Power Plants are so designed that they adequately fill the needs of isolated service stations and garages for power to supply necessary lights and current for battery charging purposes. Many of these outfits have been sold and the testimonials received are said to be very gratifying, many of the users reporting marked economy of operation and longevity of the machine.

HB generators are designed to be belt driven from the shop line shaft or by a gasoline engine and include a control panel on which is mounted the control



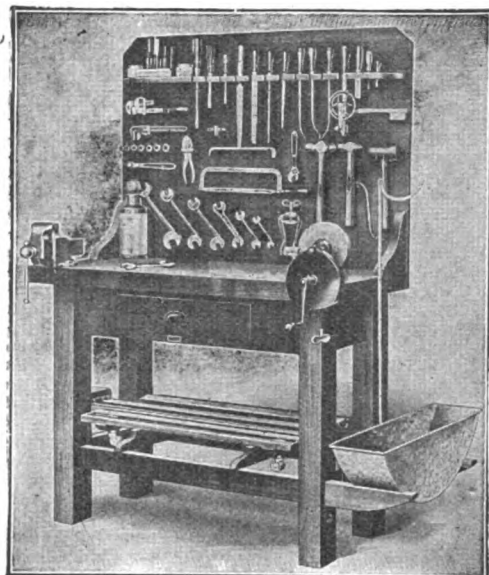
switches and instruments. Ball bearings are fitted to the armature shaft, which require lubrication at four-month intervals, reduce friction to a minimum and provide long life to the machine. The generators are built in several sizes with capacities for every need. A partial payment plan is offered the purchaser which makes possible the machine paying for itself while performing work.

Manufactured by the Hobart Bros. Co., Troy, N. Y. Prices and literature on request.

(When Writing to Advertisers, Please Mention the MOTOR TRUCK.)

The **Mototrip** is designed primarily for the private owner of a motor truck, passenger car or tractor, but can be used to advantage by anyone who is called upon to use tools occasionally in the repair of farm power machines or other devices which are used commonly about the farm, plant or small service station.

The outfit consists of a neat hard wood bench and back board of maple, equipped with every tool and device that may be



needed by the owner in making repairs to his machine. The space which each tool occupies on the back board has the shape of the tool outlined so that the tool is easily replaced after use in its correct position on the board.

A test tank for testing tubes under repair is located at one end of the bench, while a creeper for working under the truck or car is placed underneath the work bench. A hand-power grinder occupies one corner and a vise the other, with a small tool drawer underneath.

The Mototrip occupies but little space in the garage or work shop and its use in connection with home repairs will cut down materially garage repair bills.

Manufactured by H. C. Dodge, Inc., Mototrip division, 32 Alger street, Boston, Mass. Prices and literature on request.

The **Block, Jr.**, is a powerful jack that is designed and built to operate easily, quickly and safely. It is constructed entirely of heat-treated steel and malleable. The design permits of easy replacement of



parts. The extension locks securely in all positions.

The Block, Jr., jack serves practically every purpose in the average garage. Its specifications are as follows: Collapsed height, four inches; extended height, 20 inches; capacity, one ton; weight, 27 pounds.

Manufactured by the Zim Manufacturing Co., 208 North Wabash Avenue, Chicago, Ill. Price on application.

The **New American Visible Curb Pump** is of five gallons capacity, embodying the single-acting, quick-return features. The five-gallon visible container can be filled and drained in from 35 to 40 seconds. The pump itself does the measuring and discharges a mechanically accurate five gallons into the container with the graduations on the container acting only as a check. This makes it unnecessary for the operator to gauge the measure by the eye.

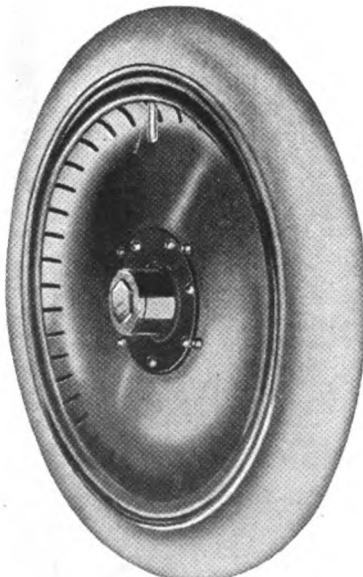
The glass cylinder, being thoroughly protected by heavy expanded metal, any chance of breakage or fire risk is removed.

The pump is arranged so as to pump five gallons into the container in 16 complete strokes, $13\frac{1}{2}$ on the up-stroke and but $2\frac{1}{2}$ on the down.



Manufactured by the American Oil Pump & Tank Co., Cincinnati, O. Prices on request.

The **Perfection Disc Wheel** is a resilient, laminated steel disc, demountable wheel, with several new and interesting features. It is made up of laminations of steel discs welded together, giving great strength and lightness. The shape and "cut-outs" in the outer diameter of the disc next to the rim, as shown in the illustration, allow for considerable resilience—unusual in this type of wheel, the load being suspended as in a wire wheel.



It is claimed that this resilience makes for easier riding and tire economy.

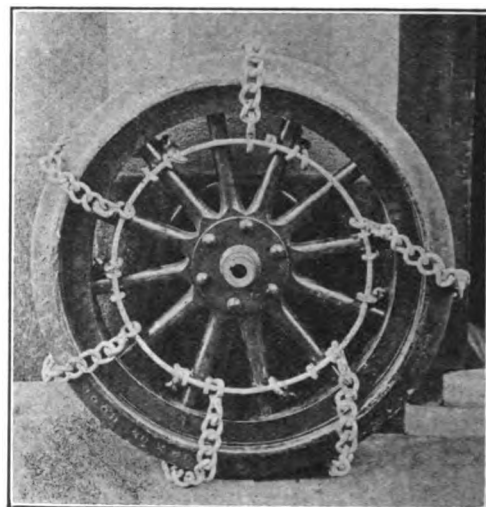
As an added feature the valve stem extends through the outside, facilitating the inflation of the tires. These wheels can be quickly mounted on the wood wheel hubs and are demountable for quick tire changes.

The Perfection disc wheels come in sets of five at considerably reduced prices. Ex-

clusive agencies are given to car dealers for their particular type of wheel, and territory is now being allotted for the coming year.

Manufactured by the Perfection Motor Parts Co., 418 Lightner Building, Detroit, Mich. Prices range from \$42.50 to \$62.50 for sets of five.

Truck-Grip Chains, the newest chain device for motor trucks is stated to be attracting most favorable attention where-



ever it is shown. The chains are snapped directly on to a steel ring, known as a retaining ring, that is fastened to the spokes by the use of hook bolts. The chains can be snapped on and taken off the ring in less than a minute. The arrangement is such that entire flexibility is obtained as to the number of cross links used. In case one wheel only encounters bad ground, as frequently happens in running off the side of the road, all or part of the links from the opposite wheel may be snapped on to secure additional traction. Broken links cause no delay and are quickly replaced.

Manufactured by the Truck-Grip Chain Co., Inc., New York City. Price, etc., on request.

The **New Klaxon 12-A Horn**, recently announced by the Klaxon Co., has the same deep, powerful, unmistakable note which is produced by the highest priced Klaxon. The workmanship and materials in this new signal are of standard Klaxon quality. The signal bears the standard Klaxon guarantee and is backed by the nation-wide Klaxon service. The low price is made possible a simplified construction requiring less labor and material.

The new Klaxon 12-A is finished in a smart black baked enamel with an orange rim. A unique feature is its three-legged universal bracket. By means of this new bracket the Klaxon 12-A may be mounted



on the dash—under the hood—of practically all makes and models of motor vehicles.

Ever since the first electric motor driven horn, the Klaxon 20-L, was built by the Klaxon Co. in 1908, which is stated to be one of the finest automobile signals made and is standard equipment on the most expensive cars, owners of medium and small cars have wanted a horn having the same dependable warning power—at a lower price. This is now afforded in the new Klaxon 12-A.

Manufactured by the Klaxon Co., Newark, N. J. List price, \$10.

(When Writing to Advertisers, Please Mention the MOTOR TRUCK.)

Calendar of Conventions and Exhibitions

Feb. 6-11—Minneapolis, Minn., Seventh Annual National Tractor Show and Educational Exposition, National Implement & Vehicle Association, Minneapolis State Fair Grounds.

Feb. 7-10—Oklahoma City, Okla., Convention and Exhibition, Oklahoma Implement & Hardware Association; Secretary, W. B. Porch, Oklahoma City.

Feb. 7-10—Grand Rapids, Mich., Convention and Exhibition, Michigan Retail Hardware Association; Karl S. Judson, Exhibits Manager, 248 Morris Avenue, Grand Rapids; A. J. Scott, Secretary, Marine City, Mich.

Feb. 8—Minneapolis, Minn., Tractor Meeting, Society of Automotive Engineers.

Feb. 8-10—Minot, N. D., Convention, North Dakota Retail Hardware Association; Secretary, C. N. Barnes, Grand Forks, N. D.

Feb. 8-10—Milwaukee, Wis., Convention and Exhibition, Wisconsin Retail Hardware Association; P. J. Jacobs, Secretary, Stevens Point, Wis.

Feb. 8-11—Flint, Mich., Automobile Show, Flint Automobile Dealers' Association.

Feb. 9-10—Kansas City, Mo., Kansas City Motor Car Dealers' Association.

Feb. 11-18—Kansas City, Mo., Automobile Show, Kansas City Motor Car Dealers' Association, Overland Building; Manager, E. E. Peake.

Feb. 11-18—Atlanta, Ga., Second Annual Great Southern Automobile Show, Passenger Cars, Trucks and Accessories, Atlanta Automobile Association, Auditorium Armory; Show Manager, Virgil W. Shepard, 305 Connolly Building.

Feb. 11-18—San Francisco, Cal., Sixth Pacific Automobile Show, Motor Car Dealers' Association of San Francisco, Exposition Auditorium; Passenger Cars, Trucks, Tractors and Accessories; G. A. Wahlgreen, Manager, 215 Humboldt Bank Building.

Feb. 12—Madison, Wis., Ninth Annual Show, Automobile Dealer Division, Association of Commerce; Passenger Cars, Trucks and Accessories; Don W. Mowry, Manager, Cartwell Building.

Feb. 14-16—Chicago, Ill., Convention, Illinois Retail Hardware Association, Hotel Sherman; Leon D. Nish, Secretary, Elgin, Ill.

Feb. 14-17—Philadelphia, Pa., 21st Annual Exhibit and Convention, Pennsylvania & Atlantic Seaboard Hardware Association, Inc., Commercial Museum; Automobile Accessories, Etc.; Sharon E. Jones, Secretary, 1314 Fulton Building, Pittsburgh.

Feb. 14-17—St. Paul, Minn., Convention, Minnesota Retail Hardware Association; H. O. Roberts, Secretary, 1030 Metropolitan Life Building, Minneapolis.

Feb. 14-18—Kalamazoo, Mich., Automobile Show, Kalamazoo Automobile Dealers' Association.

Feb. 17-28—Trenton, N. J., Automobile Show, Trenton Automobile Trade Association, Second Infantry Armory; Manager, Frederick Petry, Jr.

Feb. 18-25—Hartford, Conn., Automobile Show, Hartford Automobile Dealers' Association, State Armory; Manager, Arthur Fifoot.

Feb. 18-25—Albany, N. Y., Automobile Show, Automobile Dealers' Association, State Armory.

Feb. 20-25—Bethlehem, Pa., Automobile and Accessory Show, Bethlehem Trade Association; Manager, J. L. Elliott.

Feb. 20-25—Grand Rapids, Mich., Automobile Show, Passenger Car Dealers' Association, Furniture Exhibition Building; Manager, M. D. Elgin.

March 11-18—Bronx, N. Y., Bronx County Automobile Show, Passenger Cars, Trucks and Accessories, 105th Field Artillery Armory, 166th Street and Franklin Avenue; Manager, H. G. Stiles, 2483 Tiebout Avenue, Bronx.

March 11-18—Newark, N. J., Automobile Show, Newark Automobile Dealers' Association.

March 11-18—Boston Show, Mechanics' Building.

March 13-18—Boston, Mass., Automobile Salon, Boston Automobile Dealers' Association, Inc., Copley Plaza Hotel; Manager, Chester I. Campbell.

March 13-18—Omaha, Neb., Automobile Show, Omaha Automobile Trade Association, Auditorium; Manager, A. B. Waugh.

March 15-18—Port Huron, Mich., Automobile Show, Port Huron Automobile Dealers' Association.

March 21-22—Ypsilanti, Mich., Automobile Show, Ypsilanti Automobile Dealers' Association.

March 23—Philadelphia, Pa., Sectional Meeting, Society of Automotive Engineers.

March 24—Detroit, Mich., Meeting, Society of Automotive Engineers.

March 24-25—Ann Arbor, Mich., Automobile Show, Ann Arbor Automobile Dealers' Association.

March 27-April 1—Oklahoma City, Okla., Sixth Annual Automobile Show, Coliseum, Oklahoma City Motor Car Dealers' Association; Manager, Edgar T. Bell.

March 28-31—Benton Harbor, Mich., Automobile Show, Benton Harbor Automobile Dealers' Association.

March 31—Chicago, Ill., Mid-West Meeting, Society of Automotive Engineers, "Various Commercial Fuels and Their Relative Characteristics."

April—Buffalo, N. Y., Second Annual Motors and Sportsmen's Show, Automobile Club of Buffalo; Manager, D. H. Lewis.

April 2-8—Battle Creek, Mich., Automobile Show, Battle Creek Automobile Dealers' Association.

April 27—Philadelphia, Pa., Sectional Meeting Society of Automotive Engineers.

April 28—Detroit, Mich., Meeting, Society of Automotive Engineers.

May—Trenton, N. J., Annual Convention, New Jersey Automotive Trade Association; Secretary-Treasurer, H. S. Moore, Trenton.

May 1-15—Scheveningen, Netherlands, Second Annual Automobile Exhibit; Secretary, No. 185 Spul, The Hague.

May 16-19—Chattanooga, Tenn., Convention and Exhibition, Southeastern Hardware and Implement Association (Alabama, Florida, Georgia, Tennessee); Secretary, Walter Harlan, Jacksonville, Fla.

June 11-15—Milwaukee, Wis., International Convention of Associated Advertising Clubs of the World.

June 19-25—Colorado Springs, Col., Summer Meeting, Automotive Equipment Association.

September—Rio de Janeiro, Brazil, Automotive Exhibition in Connection with Brazilian Centenary.

Sept. 18-23—Rome, Italy, Second Annual Meeting, International Chamber of Commerce.

Nov. 13-18—Chicago, Ill., Annual Convention and Business Exhibit, Automotive Equipment Association, Coliseum.

NATIONAL forests in the Centennial state had 1,200,000 visitors in 1921, an increase of 10,000 over 1920, according to the United States forest service. Many travellers were attracted to the land of living glaciers, in Colorado national forest, where 435,000 people were registered; others went to San Isabel and Pike reservations to fish, hunt or climb.

MANY who pitched tents in Overland park liked the climate so well that they decided not to hurry away; instead, they put up at a hotel or moved into an apartment. The secretary of state's office issued complimentary licenses, good for 90 days, to many, whose average stay was from three to six weeks.

Rocky Mountain National park was first among all parks during 1921, with an attendance of 273,737, an increase of 32,771 over 1920, and 100,573 more than the combined registration in Yellowstone and Yosemite national parks, according

LONE HORSE-DRIVER USES ELECTRIC HORN

TO COMMAND from pedestrians the respect they show operators of automobiles, a driver of a horse-drawn wagon in New York city has installed an electric horn such as is used on motor vehicles. The dry cells are beneath the driver's seat and the push button is conveniently located. It is not recommended that electric horn manufacturers spend too much money in developing this market, however, as the sales possibilities are too limited—the horse will soon be as rare as the far-famed Dodo.

to government figures, which are carefully compiled from authentic data.

SQUEAKING SPRINGS.

ASURE cure for squeaking springs and one that has been tried many times and not found wanting is composed of two-thirds paraffin and one-third graphite.

These two ingredients are first melted separately and then mixed while hot and immediately applied to the spring leaves with a brush. The car should be raised with either jacks or block and falls so as to allow the springs to open as far as possible. Work the mixture well between the leaves and after all are finished, lower the car on to the wheels. The mixture will quickly cool, and if necessary, residue can be wiped off.

OILING CAR DOORS.

Don't use ordinary cylinder oil as a lubricant for door hinges and latches. It has a tendency to run, which is not desirable at this location, because the clothes of passengers are likely to come in contact with it. Linseed oil mixed with a small amount of graphite is much better for this purpose. This furnishes a good lubricant and will not run.

Substitution of Motor Busses

(By F. VAN Z. LANE, C. E.,* Transportation Engineer, 17 East 42nd Street, New York City.)

THE capacity of many New York (Manhattan) streets has already been reached. Yet, every day, more and more vehicles are presented for accommodation. This increasing congestion is making it more and more costly to transport both passengers and freight because of the decreasing speed with which both passenger and freight vehicles can operate. Street accidents are increasing. All this despite the fact that

this street traffic is more efficiently controlled and regulated than any other city in the world. The roadway area is limited. As much as possible has already been taken from the sidewalks and added to the highways. The entire street width between building lines cannot be increased, or new streets cut through without entailing a prohibitive expense, except perhaps in some isolated cases.

THE roadway capacity, however, can be very materially increased and the streets made safer by the substitution of motor buses for street cars. The large, lumbering street car confined to a fixed position in the center of the roadway presents an unsafe obstruction (whether it is moving or standing still) to modern vehicular traffic. Everybody recognizes this fact, but has accepted this condition, because they have not realized that there is a remedy. But there is a remedy in the motor bus.

The motor bus is no longer a theory. It is a demonstrated fact. It has proved to be an efficient means of city transportation right here in our own city. We don't have to cite London, Paris, Berlin, Copenhagen, etc., where it is a most important means of surface passenger transportation.

The successful operation of the Fifth Avenue Coach Co., the operator of the buses in Fifth Avenue, Riverside Drive and other streets, is sufficient demonstration.

For the year ending June 30th, 1920, this company operated 271 buses, which carried 42,552,709 passengers, or 157,021 passengers per bus. During the same time the Manhattan surface car lines carried 348,960,461 passengers

in 1254 cars, or 278,278 passengers per car. The number of passengers per bus is smaller than the number of passengers per car, because the buses operate over routes of lighter density than the street cars. Their routes all lead to practically one place (lower Fifth avenue), a smaller protected seating capacity (lower deck), no standing permitted, and because of the route layout and a 10 cent fare, the individual rider averages a longer ride. Yet with this loading per bus, it would have required 2222 buses to have handled the surface car traffic, compared with 1254 cars which did handle it.

Now, in so far as an increase in the number of units possibly required to handle this traffic, anyone will agree that so far as space, operating flexibility, hinderance to traffic, etc., is concerned, it would take several buses to equal one street car.

Bus Speed Relieves Traffic.

However, because of the increased speed with which buses can operate under equivalent city traffic conditions and because in this case they would cut down congestion and so be sure of operating faster, it is quite possible that it would require no more buses than street cars.

And this is not the whole story from this standpoint. A bus is more desirable in narrow congested streets because it is more flexible. It can move in and out of traffic, one bus can pass another, they can be turned at any point; run off the established route, if necessary; held in a side street for a special load, and load and unload next to the curb, out of the way, making it unnecessary for their passengers to ex-

pose themselves to the dangers of other street traffic, or hold it up while such loading and unloading is going on. Dangerous loading and unloading zones designated by obstructions in the middle of the street are unnecessary.

Not only would street capacity in the straight away be increased, but congestion and danger at the most congested points would be materially cut down.

Everyone knows of the terrific congestion at 42nd street and Madison avenue, for instance. Here the Madison avenue cars turn into 42nd street for a short block and thence turn again into Fourth avenue. This in the face of the 42nd street crosstown cars and the great vehicular and pedestrian traffic occasioned by the Grand Central terminal and the hotels and new office buildings surrounding it. With bus operation they could continue straight across and turn into Fourth avenue at any street south of 42nd street.

And similarly the congestion occasioned by diagonal Broadway at Union square, Times square, Columbus circle, 66th street, 72nd street, as well as other points about the city, buses because of their flexibility and ability to move with the other vehicular traffic could be routed so as to avoid being obstructions to other traffic.

Street Car Stops Traffic.

The elevated railroad street, Second, Third, Sixth and Ninth avenues would be wonderful vehicular streets with the surface cars removed and the buses substituted, even with the elevated columns. Without these they would be safer. But, even so, the space now occupied by cars, between the columns, would be open to fast moving through vehicles, the space



Busses with Standard Chassis and Stunkard Brothers Bodies Operated Out of Indianapolis, Ind.

at the side to buses. The possibility of this can be realized by simply watching the traffic on these streets. It goes along in great shape until interrupted by one lone street car.

With bus operation, Central Park West could then be made a two way—north and south—street, and so the full use of this roadway would be made use of. It is a one way street now (south bound) all the way from 110th street to 59th street, not because of congestion, but because the north and south bound car tracks are on one side, and if permitted on the street, north bound vehicles would proceed in the face of south bound cars. Simply a safety precaution which would be obviated by bus operation.

Lafayette street and Broadway below 42nd street) have approximately the same width roadways. Broadway is encumbered with street cars. Lafayette street is not, yet Lafayette street carries several times the vehicular traffic Broadway does, simply because it can move faster. Verify this statement by driving an automobile on both streets; this will also prove that Lafayette street is the safer.

That buses are quite as reliable as street cars is borne out by the fact that during the year ending June 20th, 1920, each bus averaged 31,707 miles, whereas each street car averaged but 26,223 miles. Some of this increase is no doubt due to the increased speed with which a bus can operate. But if further proof is necessary, during this year there were practically no bus field failures. And in this connection it must be remembered that if a bus does break down, it is the only thing that is held up. If a car breaks down, practically the whole street is tied up, and the cars following it absolutely. Some of the New York bus routes are quite as long as the longest street car routes, and yet they stand up under this grilling. All of us can remember that in the great snowstorm of February, 1920, how the buses were moving when the cars were stalled.

Would Decrease Taxicabs.

Because of their flexibility and speed, buses would not only present less of an obstruction, but they would also tend to decrease a certain type of vehicular traffic, or at least hold it where it is; that is, the taxicabs. And who cannot say that, from a street traffic standpoint at least, this would be a blessing? A bus performs a more individual service

than a car. It comes up to the curb for you and lets you off at the curb. It will get you from point to point faster. And if this mode of transportation was generally adopted many more routes could be easily and conveniently laid out. All that is necessary is good pavements, and these are found on practically every street in Manhattan.

Bus Costs Less to Operate.

It costs less to operate buses than surface cars in Manhattan. The operating expenses per bus mile for the year ending June 30th, 1920, was 35.54 cents, and the operating expenses per car miles for the same period was 53.59 cents, or, in other words, it cost 50 per cent. more to operate cars than buses. But because of the fact that buses carried fewer passengers per bus for the reasons already stated, it is not claimed with absolute certainty that buses could be operated for a five cent fare and made to pay. The fifth avenue bus fare is 10 cents and at this rate this company showed a net income for the year of \$783,127.95, whereas the surface cars showed a net income of \$4,378,677.48; or the buses a net income of 1.8 cents per passenger and the cars a net income of but 1.2 cents per passenger. Of the total net income of all Manhattan car lines, 83 per cent. was produced by the New York Railways, which company has the greatest number of short haul lines.

Could Operate With Five Cent Fare.

It is, of course, recognized that on the basis of the figures for 1920 the buses would not have paid expenses at the rate of a five cent fare. Yet there is plenty of room for belief that in view of the fact that it costs less to operate a bus, that if buses were operated over short haul routes of high passenger density, and if buses were designed perhaps with a larger seating capacity, they could be made to pay at a five cent fare, particularly with a combination of single deck, one man operation and double deck, two man operation, and with a large installation electricity may prove to be even more economical and better adapted than gasoline for power in this kind of service. Certainly with a city-wide operation more people would ride at a five cent fare than at a 10 cent fare, yet because of the long bus hauls of the Fifth Avenue Co. and because they operate over a comparatively lean passenger producing territory, feeding into but one limited business section of the city, it is doubtful if it could have met expenses

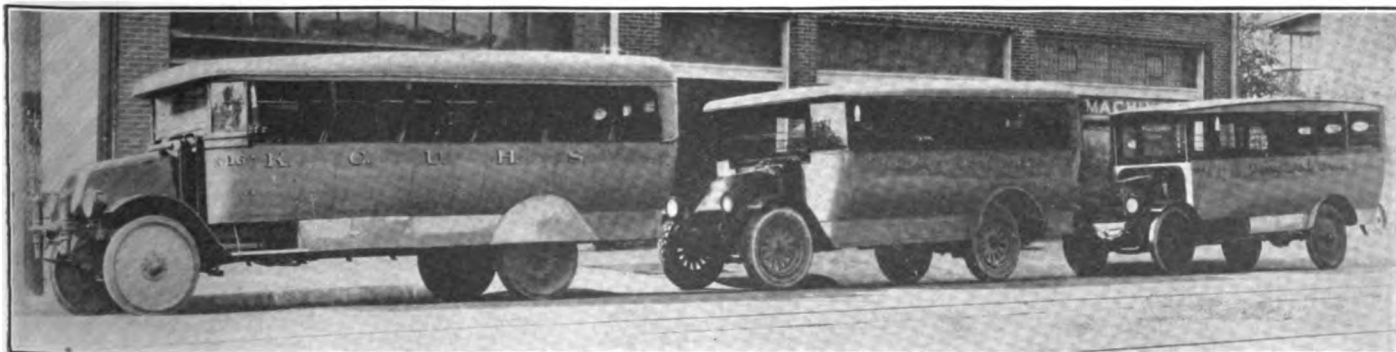
at a five cent fare. It must be remembered, one important line of this company operates on Fifth avenue where on one side from 59th street to 110th street, Central park is on one side and the wealthiest homes on the other, certainly not a very populous district. The other main route operates along Riverside drive, from 72nd street to 135th street, with Riverside drive park on one side and very high class homes and apartments on the other, so this is not a very populous district. Most of the bus riding is from lower Fifth avenue to points above 110th street on the one route and to the north of 135th street on the other route. Certainly long hauls for city street traffic.

Buses Twice as Safe.

That bus operation is safer than street car operation in Manhattan is conclusively indicated by the fact that in 1920 the Bus Company paid out but 2.7-10 per cent. of its total operating revenue for injuries and damages, whereas the street car companies paid out 6 per cent. of their total operating revenue for these items. In other words, the buses are more than twice as safe as the street cars, despite the fact that the entrance to the bus is open and presents a temptation for anyone to swing on to the bus while it is in operation, and also despite the fact that many passengers have to ascend and descend the curving narrow stairway to the upper deck of the bus while it is in motion. This situation is also reflected in the cost of operations—that is to say, the cost of the item of injuries and damages under operating cost are less for buses than for street cars, and so, of course, it is reflected in the total costs of operating.

Bus Here to Stay.

The basic figures quoted herein are taken from public service commission reports for 1920. The 1921 figures were not fully available, yet the indications are that they would be even more favorable to the bus. The bus has come to stay. There is no use fighting it. It is the economically sound method of supplementing subway and elevated railroad traffic in the transportation of large numbers of passengers in a large city. The stage coach had to give in to the horse car, the horse car to the cable car, the latter to the trolley car, and now the trolley must give in to the motor bus. The fact remains that buses in New York have proven themselves a success over a period of years in New York.



International Motor Trucks with Large Capacity Passenger Carrying Body Prove Successful.

WOOD DETROIT HOISTS--*Built by "Gar" Wood*

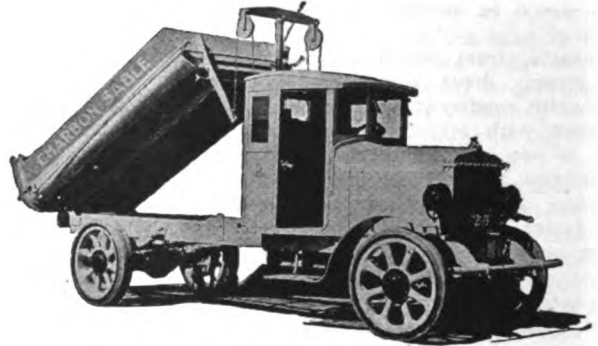
Wood-Detroit Hoists are used in every line of business having need of power dumping trucks and on every make of truck; they are the standard by which all others are judged.

Wood-Detroit equipment in use *outnumbers all other makes combined.*

The guaranty that is implied by the phrase "Built by 'Gar' Wood", is recognized by manufacturers, dealers and users alike; for they know that the man who developed the "Miss America" could not be satisfied short of perfection in any mechanism bearing his name.

For Any Chassis, Old or New

Now, with the three types—vertical, horizontal and underbody—and with a full line of standard and special bodies, the Wood-Detroit dealer is fitted to meet every demand in the field. And the new prices make sales easy. It's a mighty profitable line to handle; let us tell you the details of our dealer's proposition.



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DENBY MOTOR TRUCKS



MODEL 33, 1½-2 TON BUS

Operated By

STAR TRANSPORTATION COMPANY

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DENBY MOTOR TRUCK COMPANY

DETROIT, U. S. A.

New Bessemer Prices

We Have Made Drastic Price Reductions

1 Ton was
\$1,700.00 Now **\$1,395.00**

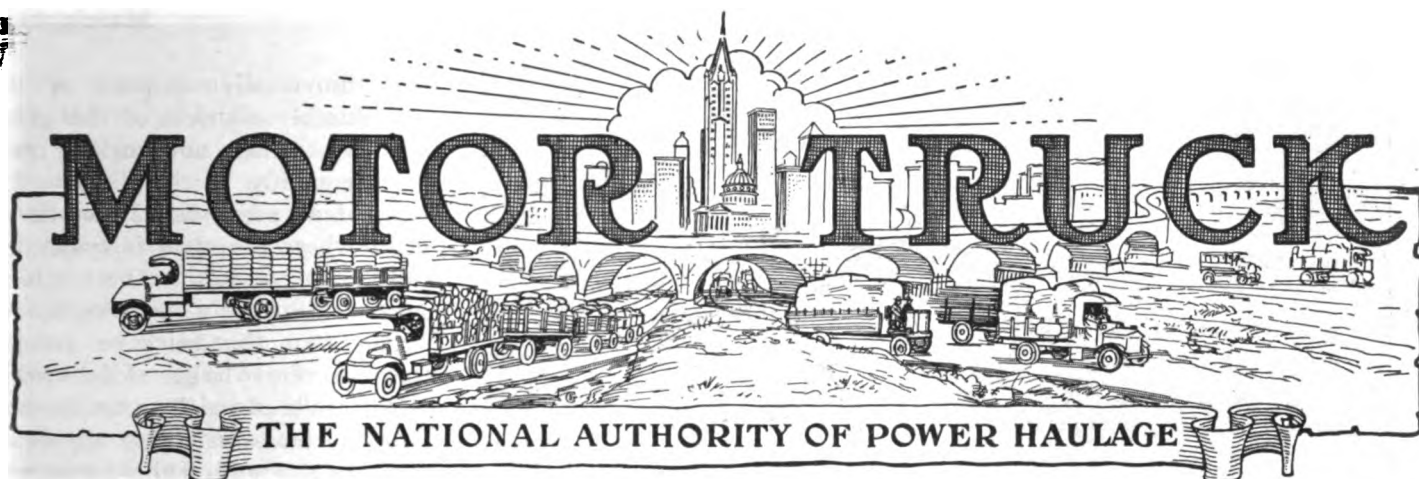
1½ Ton was
\$2,445.00 Now **1,995.00**

2½ Ton was
\$3,285.00 Now **2,595.00**

4 Ton was
\$4,485.00 Now **3,495.00**

Electric Starter and Lights Extra

(When Writing to Advertisers, Please Mention the MOTOR TRUCK.)



VOL. XIII. NO. 3.

PAWTUCKET, R. I.

MARCH, 1922.

Motor Truck Indispensable to Lumber Industry

**Fills Important Role in Logging Camp and Enables Retailer
to Distribute Finished Product Economically—Modern
Farmer Also Indebted to Power Hauler.**

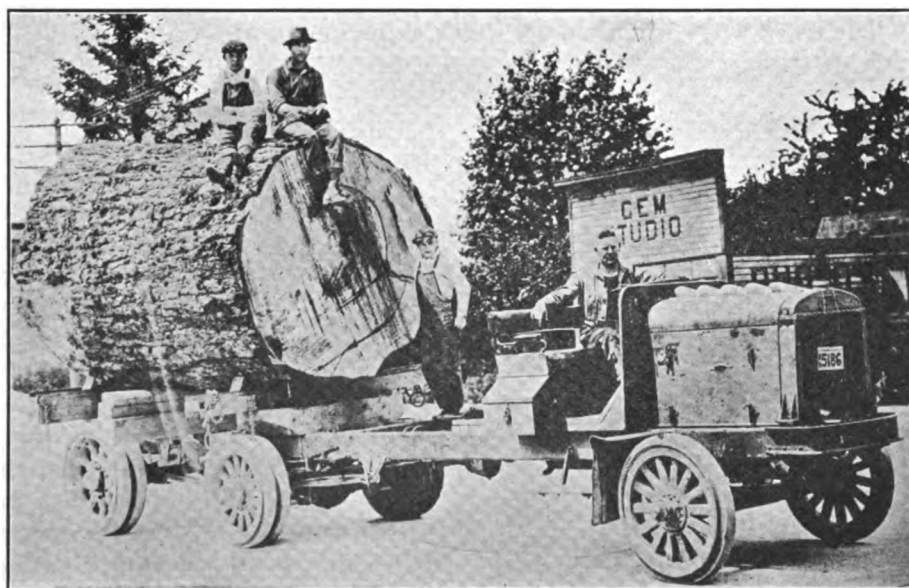
THAT the motor truck is making itself indispensable in the lumber industry has been apparent for some time and the experience of the D. J. Rohrer Lumber Company, of Clintonville, Wis., only serves to accentuate this well known fact. This company is engaged in manufacturing, buying and selling lumber, building material and interior finishing, a type of business which at times requires the hauling of exceedingly cumbersome and heavy loads from the forest to the purchaser or from the retail yard to the ultimate

consumer. Until the early part of the past summer this company had depended on the horse drawn vehicle for all heavy haulage work, considering it the most suitable means of handling unwieldy transportation. At that time, however, a used three-ton F. W. D. truck and a five-ton trailer were purchased and since then the company has been enabled to buy material within a radius of 50 miles and haul it directly to their own yards at lower expense than was ever possible with the horse drawn vehicle.

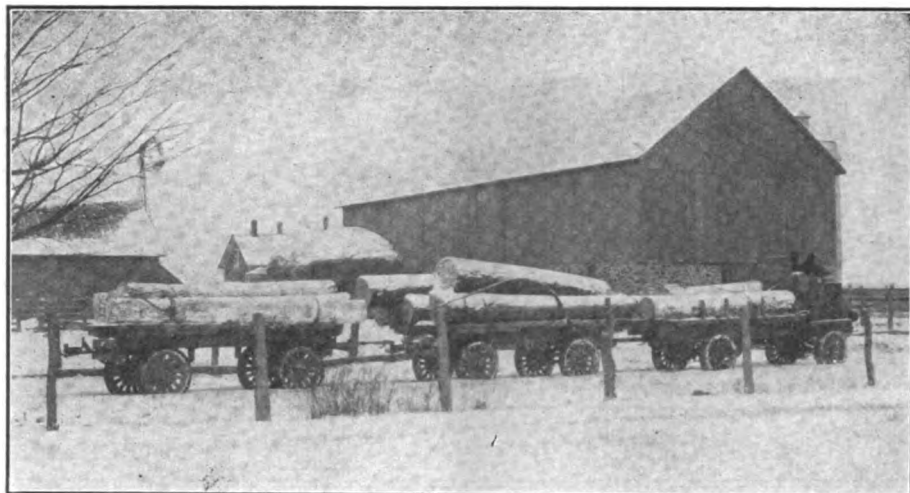
IN ADDITION to this the delays that formerly were quite frequent in freight shipments have been eliminated and the company is enabled to purchase the material in smaller quantities. Many times also it is possible to deliver from the source of supply to the customer direct by use of the truck, dispensing with the former necessity of unloading large shipments in the company's sheds only to re-

load them a short time afterwards and deliver them to the customer.

As an example of this latter phase the company sold to the American Plywood Company of New London, Wis., an assignment of red oak veneer logs late in December. These logs were to be delivered immediately, which necessitated their being hauled a distance of approximately 30 miles. The possibility of heavy storms at this period of the year is very great in Wisconsin and



One of Many Loads That Are Accounted a Part of the Day's Work by the Powerful Motor Truck. Who Would Go Back to Horses?



Towing Two Fully Loaded Trailers Is Easy for This Machine.

the company, realizing the loss to be experienced in case of delay, immediately put the truck and two trailers at the task of transporting the logs. The gasoline motor train required but 12 working days to complete the task, accomplishing the complete transfer of the logs from the forest to New London with ease in that time. Many of the days the weather was very stormy, making the highways traversed well nigh impassable, but this did not delay the work, as the records of the company show that the loads carried on stormy days were as great as when fair weather prevailed.

The D. J. Rohrer Company was awarded a premium of \$160 as a result of the expedient transfer of the logs, this profit being entirely and solely due to the superiority of motor truck transportation over horse drawn conveyances. The truck was

frequently overloaded during the trips referred to, a practise the company rarely allows, but circumstances very often alter the rigidity of a rule and in this case necessity demanded that the transfer be made as quickly as possible. That the entire shipment was forwarded without a single mechanical derangement is vouched for by the company and substantiated by its records. The company is unstinting in its praise of motor truck transportation and shows facts and figures as a cause for enthusiasm.

The D. J. Rohrer Company keeps a concise and correct account of the cost and operating expense of the trucks, which appears to show that they are real money makers for the firm because of quick deliveries direct to the customer, and the time consequently saved in handling every assignment.

The motor truck is becoming al-

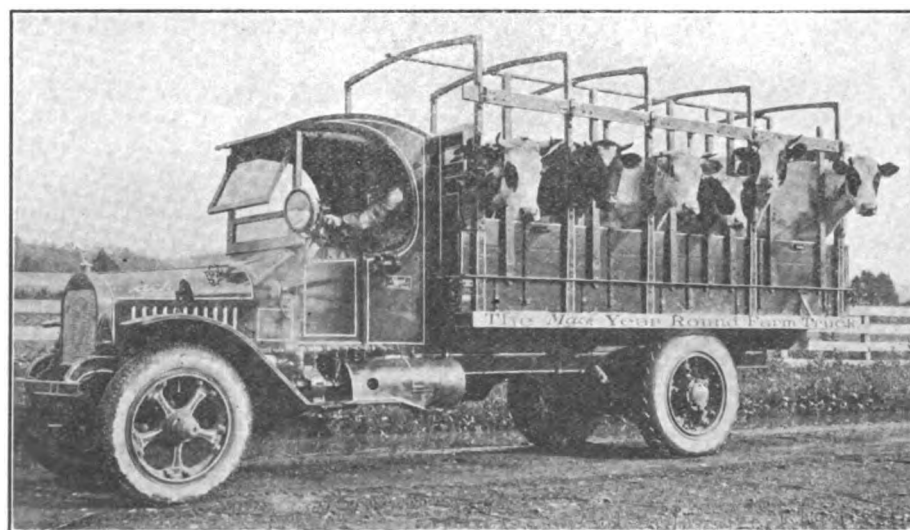
most universally adopted in the large lumber districts of the great north west, where one truck or tractor frequently accomplishes the work of as many as 12 two-horse teams where the work is systematically arranged so that the machine can be constantly kept occupied. Very often the truck or tractor draws several large sleds loaded with freshly sawed logs to the cofferdam, from which they are floated to the saw mill, if the distance is not too great, transporting the logs directly to the saw mill. During the absence of the vehicle other sleds are being loaded and made ready for the powered machine upon its return. With a competent operator the truck keeps constantly going, stopping only for supplies.

Employ Good Mechanic.

In these camps, sometimes far removed from those centers of trade where truck or tractor parts may be purchased, sufficient spare parts are carried at all times in case an accident may come. The company usually keeps in its employ a mechanic who is capable of mastering any contingency that may arise. The fuel for the machine is transported to the camp in comparatively large quantities, making the entire power plant practically independent of the outside world.

Used in Southern Forest.

In the hard pine forests of the South the motor truck is found efficiently doing the work of the locomotive without any possibility of damaging fires being started from dangerous smoke-stack. To efficiently perform this task the owner of the truck frequently removes the regularly equipped wheels and replaces them with wheels having large double steel flanges, a diameter very nearly the same as the original wheels and a bearing surface between the flanges of from eight to 12 inches. The cars or trailer used in the work are rather crude looking affairs and far removed from the ball bearing type, but are of a very sturdy and substantial construction, also being equipped with the same type of double flanged wheels as the motor truck.



Cattle Are Easily and Humanely Transported by the Truck.

The track is made of native lumber, the only steel or iron used in its construction being that employed to bind the various pieces to each other at the junctions. Roughly hewed wood is placed beneath the tracks to make the road bed, as the tracks must be laid in many places over uneven and marshy ground. In spite of all handicaps, however, the truck hauls to its full capacity each and every trip and the use of any other gear but the high after the machine gets under way is rarely, if ever, resorted to.

The huge logs are first felled by the woodmen and then are loaded on the cars to await the truck, which draws the heavily laden train to the portable saw mill. Here the logs are cut into huge square timbers, very often but four slabs being removed in order to straighten up the log. These timbers are then placed on the cars and the motor train hauls the freshly sawed lumber over the wooden rails to the owner's yards.

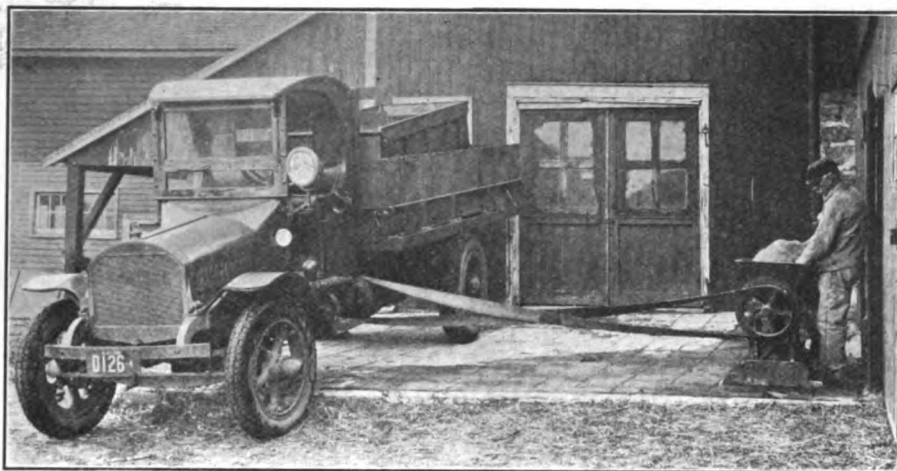
Ingenious Turn-Table.

In order to dispense with the necessity of building a loop at the various terminals on the wooden railways, a turn table made of large square timbers to work upon a central turning point has been devised in many cases. This turn table is so nicely balanced that it gives the owner perfect satisfaction, lending itself admirably to the task of turning the improvised locomotive.

Hauls Supplies to Logging Camp.

The motor truck is almost indispensable in hauling supplies to the lumber camps and is used by all lumber operators for this class of work. "The motor truck has successfully solved for us a haulage problem that has long been a source of annoyance and unnecessary expense," says Smith S. Randall, general manager and treasurer of the Augusta Lumber Company, Augusta, Me.

"Our logging operations are located 100 miles north of this city, and the old method of shipping supplies to the camps by rail was very slow and expensive. It was necessary to transfer from the main



Farm Jobs Are Handled Efficiently by Use of Special Fittings.

line to a narrow gauge road which terminated 25 miles from our camps. This last leg meant a very heavy haul for teams.

"We finally took our little Republic 1½-ton truck and shipped all necessary supplies direct from our office in Augusta to a point within three miles of our camps. This truck now makes the round trip of 200 miles each day with a load that averages 4200 pounds.

"Besides affecting a considerable saving, the use of this truck has speeded up delivery of supplies and eliminated the spoilage of food stuffs due to railroad delays.

"On a few trips we have sent out our Republic 2½-ton truck to help move supplies of considerable weight. The large truck, of course, could not make the same time as the smaller model and required two days for each trip.

"We consider the performance of

these trucks remarkable, inasmuch as the 100 miles of road which must be traversed each way comprises less than 20 miles of good haul on improved state highway. The balance is ordinary country road, and there is a stiff climb over a mountain range."

Farmer Finds Truck Indispensable.

The foregoing proves conclusively the utility of the motor truck in the lumbering regions. There is no doubt in the mind of the student of the great saving of money, time and labor effected by the use of this efficient vehicle, and it is small wonder that the farmer has found the truck well nigh indispensable in the carrying on of his farm work. Regardless of what he wants done—with the sole exception of crop planting and harvesting, the truck will perform every task in a manner that would be impossible for the stoutest team of horses to do. It



Snowbound Highways Have No Terrors for the Experienced Driver.

will carry supplies to the distant city in less than half the time that the horse drawn vehicle could accomplish the journey; it will do nearly every belt job that the tractor will accomplish if a little ingenuity is called into play, and all in all it is perhaps the greatest ally that the farmer has ever had, this provided that he gets the right kind of vehicle.

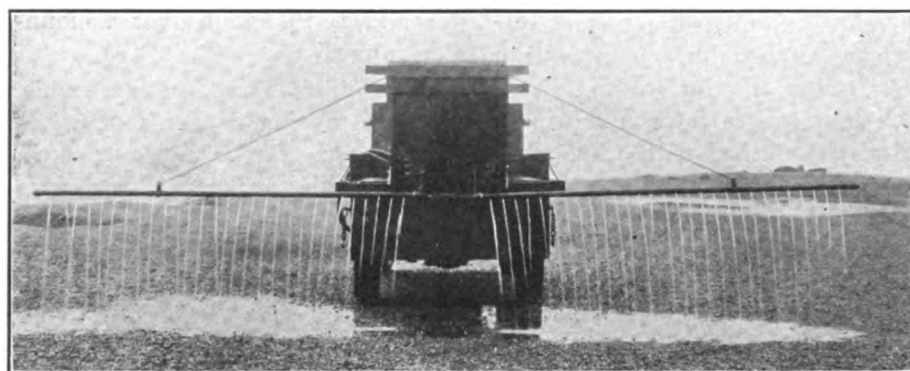
What Kind of Truck for Farmer?

George A. Petrucelli of the International Motor Company, a well known authority on commercial vehicle manufacture and operation, states that prior to the purchase of a farm truck the farmer will do well to ask himself the following question: "Will a motor truck enable me to increase my farm activities and will it perform any necessary operation



Section of Wooden "Railroad" in Southern Hard Pine Forest.

as he does his agricultural implements, to be put to work again at the next season, as there are certain expenditures such as interest on investment and depreciation which must be considered whether the truck is in use or not. Means for obtaining this versatility in farm



Effective Irrigation Is Furnished by Means of This Special Device.

about the farm more economically than is possible with other equipment?"

A careful investigation and study of actual farm conditions conducted by capable engineers has revealed the fact that a motor truck, to be financially advantageous to the farmer, must possess four principal characteristics; namely, versatility, reserve power, safety factors and accessibility.

The first and perhaps the most important of these is versatility. Upon the truck's ability to adapt itself to the various kinds of farm work which require power, depends whether or not it will be a successful investment or a poor one. Obviously, a motor truck will not prove profitable to the farmer who can use it only a few months in the year as a means of delivery and who then must store it away in the barn

truck equipment is, therefore, an important problem.

Second, the truck must have an abundance of dependable reserve power to cope with any possible emergency that might arise in the course of the work it is called upon to perform.

Third, the truck must possess ample safety factors and large bearing surfaces and journals throughout, if its maintenance is to be low and its profitable life continuous. A lack of this safety element would probably cause a serious breakdown just when the truck is needed most. For it is during the busy season that the truck is overloaded and worked beyond its normal capacity and frequently it is this extra strain that causes a truck not so constructed to collapse.

The fourth characteristic must be extreme accessibility of the truck

motor and chassis parts. Most farmers are located in isolated sections of the country—a long distance from any repair shop. Therefore, any small damage to the vehicle must of necessity be repaired by the operator himself and the simplicity of the truck's mechanism will greatly aid him in locating and remedying the trouble within a minimum of time.

An illustration of how versatility may be applied to motor truck design may be seen in the Mack farm truck, illustrated in the accompanying pictures, in which a standard chassis has been combined with a unique arrangement of convertible bodies and auxiliary attachments.

One of the many ways in which this truck may be utilized, for example, is in spraying orchards, trees and fields by means of a rotary pump, which is one unit of the auxiliary attachments. An ordinary sheet metal tank having a maximum capacity of 15 barrels may be used. This tank is set up on the body of the truck by the farmer and equipped with detachable pipes and fittings at the rear. When pressure is required a hose leading from the tank may be attached to the bronze, rotary water pump. This pump has a capacity of 35 gallons a minute, a suction lift of 12 feet and a working pressure of 75 pounds a square inch. It can also be used for white washing barns and in case of fire supplies an efficient water pressure medium it is stated.

A capstan winch, with a pulling capacity of 3000 pounds is another versatility feature of the auxiliary attachments. The winch, which is about five inches in diameter, is carried on the shaft and is operated through reduction gears which run in oil. It is very useful for loading material on the truck or for lifting bales of hay into the loft and for many other jobs where pulling power is required. In addition to this, the winch is arranged to serve as a pulley which will effectively drive a belt for operating a circular saw, a feed grinder, an ensilage cutter or a small threshing machine.

Along with these auxiliary features a unique and practical ar-

arrangement of convertible bodies has been provided. These bodies may be applied to the truck according to the commodity to be transported. For instance, if the farmer wishes to deliver bagged grain to the market, he converts the steel platform body into an all-steel, grain-tight, low box body by simply raising the hinged steel sides and steel tail gate, or if the grain is to be hauled loose the special grain tight side boards can be used. The body measures 13 feet six inches by five feet six inches. The sides are supported rigidly in position by means of triangular steel braces, one on each side near the rear of the truck and also by hook and links used on front and rear. In the transportation of cattle, a special rack body is rigged on to the steel bed.

That the motor truck has demonstrated its superiority over any other form of hauling equipment for hauls up to 100 miles, is indicated by the increasing number of trucks in use on the farm today. But before buying a truck the farmer should first consider whether the size of his farm warrants its purchase and second whether he has enough work on hand to keep it busy.

Uses Truck to Prepare Seed Bed.

That the average farmer will find innumerable advantages attached to power farming over the old horse operating age no one can doubt. The writer calls to mind one enthusiast who states that he is operating an 85-acre farm—that formerly employed the combined services of six horses and three men—with one three-ton truck, a small roadster and one hired man. He claims the entire expense of operating the truck and roadster for the last two years has been less than half what he formerly paid for grain and hay fed to the horses.

This man has a three-point plow, a 12-disc harrow, a mowing machine and many other horse drawn devices which he still uses by means of an ingenious attachment consisting of two extension pieces of pressed steel which fastens directly to the front portion of the truck frame. To these extension pieces a



Method of Turning Truck Used on Logging "Railroad" in Southern State.

cross beam is attached which protrudes on each side of the truck body. To this cross beam the machine being used is fastened. This manner of fastening the various farm implements to the truck allows him to reach the corners of the fields far better than if the truck

ing kept busy in fair weather or foul by properly laying out the working schedule. When the truck is not employed in making deliveries a specially constructed pulley is fastened to one of the rear wheels by bolts and clamps. To this pulley a circular saw is attached by a belt.

The rear end is supported on three special jacks and a clamping device holds the opposite wheel firmly in its grasp. A very clever arrangement on this power plant and one that proves conclusively that necessity is the mother of invention, is the installation of a former steam engine ball governor for use in regulating the speed of the engine. This governor is oper-



This Farmer Believes in Making Extra Money During Dull Seasons.

drew the machines from the rear; it also allows him to see the operation being done very easily and the operator on the plow or harrow and the man on the truck can work in comparative unison—all of which in the hands of a very ingenious man might work well enough, though decidedly it is not recommended for the ordinary farmer.

Sells Firewood.

For a short time during the winter months this industrious farmer becomes a fire wood dealer. The wood is hauled from the forest, sawed and delivered to the customer, the motor truck furnishing the power for all operations and be-

ated by a one-inch belt from the pulley on the rear wheel.

The butterfly valve of the carburetor is attached to the governor through a rod and bell crank and if the engine starts to slow down under the load the governor balls drop. This opens the butterfly valve and causes the engine to speed up. When the load is taken off the engine it immediately starts to race, but the balls of the governor immediately raise and by so doing cut down the amount of fuel fed to the engine. When the truck is to be used once more for hauling, all the attachments are easily removed and placed to one side until needed again.

Motor Trucks Feature of Boston Show

Thirty-Four Exhibitors Display Latest Models to Approving Visitors—Keen Interest Shown and Brisk Selling Season Prophesied.

IF THE sales interest shown in the motor truck exhibits at the Boston Show is any criterion by which the industry as a unit may be judged, it can be stated with all sincerity that business has started on the upward curve. True, it apparently has gotten away to a somewhat slow start, and it is just as true that only a certain limited number of the more popular makes of trucks are participating in the renewed interest of the buying public, but even a slight activity is welcomed as

prognostic of the trend of the times, and the more optimistic of the manufacturers are expressing the opinion that a few months will see the truck business better than it has been for more than a year—although these same authorities emphatically state that the days of easy sales are gone for good. They also point out that the business as a whole must undergo a thorough weeding out process before any genuine era of even conservative prosperity can be experienced.

AND in view of the fact that truck manufacturers—great and small, totaling more than 200 exceed in numbers the manufacturers of automobiles, it is possible that the foregoing statement is entirely correct since the market for trucks, as compared with that for automobiles, thus far has not exceeded the approximate ratio of one in 10. Overproduction is the factor that in great measure accounts for the recent depression, say the authorities who have followed closely the trend of every situation that has marked the career of the motor truck industry. They also state that it is entirely possible—and probable—that there are all together too many different makes of truck manufactured for any one of them to do other than a conservative amount of business, despite any expected increase in general prosperity.

Thirty-Four Exhibitors at Show.

It quite naturally happened that only a comparatively small proportion of the truck manufacturers displayed their wares at the Boston Show. For one thing space was limited to a portion of the basement at Mechanic's Hall, conditions not warranting Chester I. Campbell, general manager of the show, in providing extra quarters outside of the building.

Interest in the various exhibits was particularly good and while actual sales were not the rule, the dealers exhibiting were unanimous in declaring that prospective purchasers far outnumbered those of any

previous year and it is entirely probable that a great many sales eventually will be made to these prospects.

The chassis equipped with special body jobs attracted the greater



Mechanics Building, Scene of Many Successful Boston Motor Shows.

amount of attention and more than ever the indications showed that the buyer of motor trucks nowadays is intensely interested in obtaining the type of body best suited to his needs. The chassis exhibited at the show in no case differed materially from those displayed last year. There were few mechanical changes noted that could be spoken of as innovations, and such as were evident were refinements rather than radical departures from the general standard that has prevailed for the last few years.

Trucks Show Better Balance.

The new trucks are better balanced it would seem, and in many instances spring suspension has been improved, but novelties of design are few and far between. The problem of lubrication has received attention until it has ceased to be a problem and other minor refinements also are noticeable, but "by and large" truck development, as exemplified by the exhibits, remains just about where it was a year or two ago. This is as it should be since it shows that the engineering genius of the truck designer has conquered practically every obstacle—all of which means that the motor truck is surely as far—if not further—advanced as the automobile.

Value Dominates All.

It is pertinent to speak of one other factor in connection with the motor trucks offered to the buyer this year—that factor is value—Never before has the purchaser been assured of as great a return for his money in this particular field as is offered by the trucks of 1922. Considering the prices of the vehicles in comparison with "value received," the purchaser, if he be fair minded, must concede the point, and surely if one is thinking of buying—whether it be one truck or a fleet—he can do no better than to make his purchase at once, for it is entirely probable that by the time another Boston show rolls 'round the prices will have advanced.

G. M. C. Attracts Attention.

Perhaps the exhibit that attracted fully as much attention as any, was that of the General Motors Truck



Chester I. Campbell, Manager of Boston Automobile Show.

Company, which was displayed by the Noyes-Buick Company in spaces 318-319-320. Here were shown a complete line of chassis, including the Model K-16 one-ton job, the K-41 two-tonner, the K-71A 3½-ton and the K-101A five-ton models. Salesmen working at the exhibit said that interest was exceptionally keen, sales good and the list of prospective purchasers a long one.

Commerce Arouses Interest.

The Commerce truck, exhibited by the Commerce Truck Company of New England, had spaces 228-229 and the two vehicles shown were the Model T (one-ton) and 16 (two-ton). This exhibitor reported that exceptional interest was shown in the light job and several sales made to visitors to the show, salesmen at these spaces stating that the prospects for a good summer business were more than satisfactory.

International Harvester Pleases.

Spaces allotted to the International Harvester Company were 221-222-223. Four models were shown; the Model 2-S, the well known ¾-ton chassis which has aroused such favorable interest in the urban delivery field; Model I-31, the 1½-ton job; Model I-61, the three-tonner and the five-ton Model I-101. This exhibit was well patronized throughout the week, the

light delivery model causing an interest that was entirely pleasing to the management, while the large models also came in for much favorable comment.

Dort Shows One-Half Tonner.

The Dort Motor Car Company, represented by the Utterback-Gleason Company, Inc., Space 340, displayed the Model 109—½-ton truck. This job which has recently been developed for the light delivery field, was well received by the public and many prospects were secured, several sales also being reported by the booth management.

Kelly Shows Five Models.

Kelly-Springfield, without which no show would be complete, was represented by five models, shown in spaces 330-331-332. These were the Models K-34 1½-ton; K-41 3½-ton; K-61 five to seven-ton, and two models of the Larrabee Speedwagon. As usual, this pioneer manufacturer had a capable looking line of vehicles and attracted the usual crowd of owners and prospective purchasers.

Reo Shows Special Body Jobs.

The Reo line, shown at space 321-322-327-328 by the Linscott Motor Company, displayed an even half dozen of the F models, five of which were shown with special bodies. Needless to say this manufacturer's 1922 product but added to an already established prestige and it is safe to assert that this exhibit accounted for fully as many sales as any other.

Selden Line Complete.

The Baker Motor Sales Company, Selden distributor, space 336-337-338, showed three of the popular models, the unit 50 2½ to 3½ tons; unit 70 3½ to five tons and unit 90 five to seven tons. These models were objects of interest to visitors and several sales were reported by the management.

Miniature Autocar.

One of the features of the show was the quarter-size working model of the five-ton heavy duty Autocar. The model is complete in every way except that a small electric motor operates it in place of gasoline. Gears can be shifted and the entire mechanism of the standard double

reduction rear drive can be seen in operation. Skilled mechanics have been especially impressed with the workmanship of this model. In the radiator alone there are more than 400 different pieces of metal.

Will Go to Smithsonian.

This is one of the models which will finally find its way to the Smithsonian Institution of Washington, D. C., for a part of the transportation unit of that permanent exhibition. All the operations essential in constructing the full size truck were necessary in building the miniature vehicle which took 18 months to produce.

Harper Hanger Unique.

Another exhibit which attracted much favorable comment was the Harper Hanger, displayed on a Packard truck by E. B. Barger & Sons Company of Boston. This unit, which may be spoken of as a universal joint suspension, which permits the body of a truck to swing freely on its chassis in any direction, is said to operate effectively under a load of any size.

The revolutionary principle involved is centered in the Harper Hanger Link, which is merely a twisted circle of steel mounted on transverse bars of steel secured at right angles to each other, the dependent bar on the body of the truck and the supporting bar on the chassis frame. On these links, in sets of four to 10, according to the size of the truck, the heaviest load swings gently without jolt or jar, and without friction of parts and without vibration. In a word, every load becomes a live load, and every truck so equipped becomes a long-lived truck.

Cushions Load in All Directions.

The Harper Hanger supplies the equivalent of a cushion or spring (without the disadvantages of a spring) placed in the correct location. It permits the cushioning of the load in all directions, longitudinally, transversely and vertically. The construction of the hanger is simplicity in the extreme, there being only three elements, which require no lubrication of any description. The life of the hanger is therefore infinite, since it requires posi-

MOTOR TRUCKS EXHIBITED AT BOSTON AUTO SHOW.

Autocar	Nash
Brockway	Northway
Chevrolet	Oldsmobile
Commerce	Packard
Cunningham	Phenix
Dodge Brothers	Pierce-Arrow
Dort	Rainier
Ford	Reo
G. M. C.	Republic
Graham Brothers	Selden
International	Sterling
Kelly-Springfield	Stewart
Larrabee	Ultimate
Mack	Vim
Maxim	Wachusett
Maxwell	Walker
Municipal	White

tively no repairs and once installed is a permanent fixture. The location of the hanger between the chassis and the body introduces flexibility at this point, and results in a very desirable and exceptional performance. It is an extraordinary automotive improvement and one that is rapidly demonstrating its revolutionary features.

Accessories Highly Practical.

Motor truck accessories displayed in various sections of the hall were not as numerous as in former years, but this, in a sense, was offset by the fact that practically all of those shown were of a highly practical and utilitarian nature and offered a real and tangible asset to the value of the truck. Here again value predominated to a marked degree and the many motor truck owners who visited the show were unanimous in admitting this fact.

The Boston Auto Show, taken as a whole, was reasonably successful. The crowds that started to assemble with the beginning of the third day of the exhibit were record breaking, and though the motor truck displays were hidden away in the basement of the huge building, those interested had little difficulty in seeking them out as the exhibitors' record of sales and prospects very plainly shows.

The truck business, throughout New England, at least, has had a boost of a substantial nature be-

cause of the show and it is hoped—and freely predicted—that a few months will see it getting into a stride that will lead to reasonable prosperity, although with such a large number of manufacturers in a field that thus far has been somewhat limited in sales scope (though possessing exceptional opportunities of potential development), it is realized that some must drop out if the rest are to attain to any great degree of success. All of which is not pessimistic vaticination—but rather a particular obvious deduction.

WOULD ENCIRCLE EARTH.

WASHINGTON, D. C., Mar. 14. —What the new federal highway appropriation to be expended under the direction of the bureau of public roads, United States Department of Agriculture, will mean to the country is accurately gauged in a synopsis prepared by the bureau, showing the use to which the \$275,000,000 previously appropriated by Congress has been put. Up to Dec. 31, \$212,077,246 had been put to work in projects either entirely complete or under construction. To match that amount the states appropriated \$285,379,312, making a total of \$497,456,558.

If placed end to end the roads to be paid for by this money would encircle the earth at the equator and extend as far as from New York to San Francisco on the second lap. The total mileage of roads under construction and completed, the department's records show, was approximately 27,000 miles. Of this mileage 9555 miles was in projects entirely completed. The balance of 17,445 miles was in projects which were still under construction, but reported 69 per cent. complete Oct. 31. In those projects there was the equivalent of 12,000 miles of completed roads, so that the completed road to date was more than 21,000 miles, or nearly enough to encircle the globe.

Prior to five years ago the federal government took no active part in the road construction of the country. Today about one-half of all roads are federal built in part.

Walter Snow Plow

Details of Special Four-Wheel-Drive Tractor Developed
by the Walter Motor Truck Company of New York
for Fifth Avenue Coach Company

THE experience of the Fifth Avenue Coach Company has demonstrated that very good results in the clearing of snow are gained by the use of the Walter Four-Wheel Drive tractor, it is stated, and several of these newly developed machines have been used during the winter in New York City. This machine, which is a powerful high-speed tractor with a positive drive to all four wheels, is equipped with two plows, one in the front and one in the center under the body of the vehicle.

THE front blade is 10 feet in width; the center blade is 12 feet wide and both blades are arranged so that they can be swung either side and raised or lowered as desired. The action of the front blade is to slice off and push away the top of the snow while the center blade can be set down so as to scrape close to the pavement, giving a clean surface.

The motor is of a special heavy duty type of $4\frac{1}{2}$ inch bore by $6\frac{1}{4}$ inch stroke, developing a very high torque at low motor speeds.

The transmission is of a special five-speed forward and one reverse selecting sliding gear type, the five speeds being controlled by means of a single gear shift lever. This transmission permits of an exceptional large range of speeds, a speed of 20 miles an hour being possible in high gear, while an 80-to-one total reduction in low gear develops approximately 10,000 pounds draw bar pull, it is stated.

A positive drive is obtained through all four wheels by use of the Walter automatic locking differential of a patented worm and gear construction. The center differential distributes the power between the front and rear axles. The front differential is mounted in the transmission and the drive is taken

on either side through double universal shafts to the wheel gear pinion. The rear differential, together with the bevel gear drive and brakes, is suspended in the rear end of the chassis and the drive taken by double universal shafts to the wheel gear pinions. The wheel gear pinions are mounted with a bearing on each side of the gear and provided with a lubricating pocket. This form of drive has the advantage of giving minimum unsprung weight with increased ground clearance. The universal shafts take up any misalignment due to the movement of the springs or to the strain of the load carrying axles. This form of drive has shown itself to be particularly efficient under hard pulling conditions.

The positive drive to all four wheels develops maximum traction and pushing power to advance the plows against the snow. This traction is also necessary in order to overcome side thrust due to the angle of the two plows.

In the case of ordinary snow falls it is stated that this machine can plow with both blades at a speed of 10 miles per hour. These machines are equipped with caterpillar tires and chains have been found unnecessary except for very severe snow storms.

This tractor steers only on the front wheels, but due to the special universal joint construction it is said to be able to turn inside a circle of 25 feet in radius. This short turning, together with the great range of speeds results in a very flexible and easily handled unit.

It is stated that this tractor is adaptable to other commercial uses where maximum pulling power and traction are necessary and desirable, such as hauling trailers, road construction work and other uses where there are bad road conditions.

STOUGHTON APPOINTS NEW DISTRIBUTOR.

STOUGHTON, WIS., March 15.—The Stoughton Wagon Co. announces the appointment of E. P. Barnett & Company, 1916-18 Fond Du Lac avenue, as distributor in Milwaukee county of Stoughton motor trucks.

The Stoughton line embraces the Light Speed one-ton, the $1\frac{1}{2}$ -ton truck, three-ton and also Stoughton bus bodies, cabs and commercial bodies for all makes of trucks and Fords, as well as the service and repairs for all trucks.



Walter Plow Proves Effective Snow Remover.

Flood Fails to Stop Production

Transport Truck Factory Isolated by Storm Assembles
Emergency Apparatus and "Carries On"—Water
10 Feet Deep in the Boiler Pits.

HOW the Transport Truck Company fought and triumphed over the elements which recently ravaged northern and central Michigan, is a noteworthy addition to the history of industrial victories, and strikingly demonstrates that modern resources are equal to the worst emergencies.

THE Transport factory, flooded with six inches of water on the morning of Feb. 22, was in full operation 24 hours later, in spite of the fact that outside electrical power was completely cut off. The Transport's own power plant and several tractors made this possible.

The entire organization promptly set to work digging trenches to drain off the water and place all material up high and dry. Even the office desks had to be blocked up out of the water. With vacuum pumps in the boiler house completely submerged under 10 feet of water in their pits, two tractors and two eight-inch centrifugal pumps were put to work to maintain heat in the building. As soon as the water was cleared away other tractors were put in operation to run the machinery and thus keep up production.



Flood and Ice Did Not Stop Operation of Transport Truck Company. Agricultural Tractors Supplied Heat and Power.

The storm was one of the most destructive that has ever visited the State of Michigan. A slight freeze following a heavy rainstorm made the entire landscape a mass of ice. Completely covering everything out of doors, even to the smallest twig of the smallest tree, this frozen coat imparted a touch of beauty surpassing any creation of the artist's brush. A most magnificent sight, though ap-

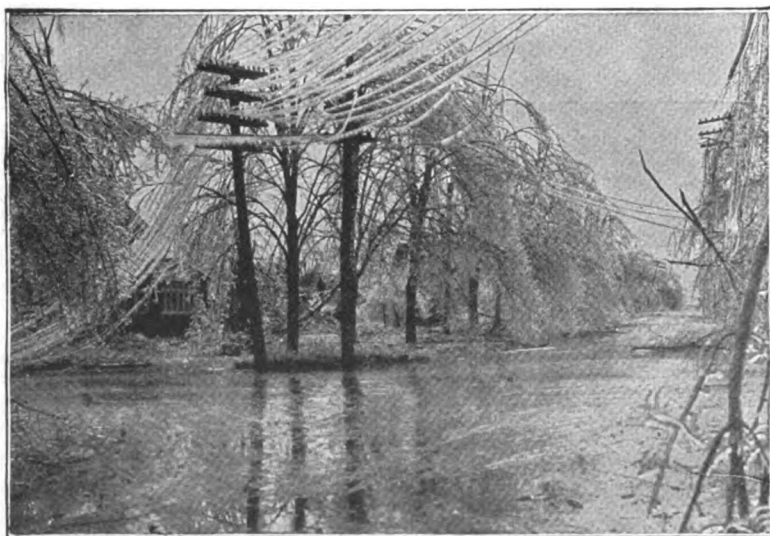
palling in its destructiveness.

Peculiar crashes, which awakened people early in the morning were the first intimation of what was happening. These were occasioned by the falling of big limbs from the ice-laden trees. Whole trees gave way under the terrific strain. The roads were strewn with telephone poles, while telephone and electric light wires were a hopelessly broken and tangled wreck.

Continuing production despite the handicap which this disaster imposed is a tribute to the recuperative powers of the Transport Truck Company, and gives some idea of its great reserve strength.

KEARNS TRUCK REDUCES ON ALL MODELS.

DANVILLE, PA., March 14.—The Kearns-Dughie Motors Corporation announces the following new prices: On Model H one-ton chassis \$1150; model H one-ton chassis with hand made four-post express body \$1350; model N two-ton chassis \$1650.



Scene in One of the Thoroughfares of Mount Pleasant, Mich., Home of Transport Truck Company, After Recent Storm.

American Road Builders Meet

THAT the good roads movement in the United States and Canada is running on high gear with an impetus that is developing the greatest road building era in all history, was demonstrated at the 12th American Good Roads Congress and 13th National Good Roads Show recently held at the Coliseum in Chicago, under the auspices of the American Road Builders' Association. With an attendance of approximately 20,000 and exhibits by 177 exhibitors of

some \$2,000,000 worth of road-building machinery, methods, materials, appliances and transportation equipment that overflowed the Coliseum and annex into two adjoining buildings, this great event proved to be the largest and most auspicious in the history of the road builders' organization. The technical papers and discussions surpassed in quality and instructive value those of any previous meeting, and sales by exhibitors are said to have broken all records.

IMPORTANT action on a number of questions was taken. Among other things the resolutions pledged the support of the American Road Builders' Association to the elimination of advertising signs, grade crossings and interurban tracks from the highways; condemned the attitude of negation displayed by railroad companies and state railroad commissions on the subject of grade crossings; indorsed the pending Woodroff highway bill which appropriates \$100,000,000 as Federal aid for good roads annually for five years beginning July 1, 1922; urged the Interstate Commerce Commission and the various state railroad commissions to put an end to present existing inequalities in freight rates on road materials, and petitioned President Harding to take such action as may be necessary for the United States to become a member of the International Road Congress.

Other resolutions pledged the association to work for efficiency and permanency in the personnel of all highway departments, and the elimination of partisan politics from highway construction. The congress also went on record as favoring a pavement width of not less than 20 feet for all truck highways or roads carrying dense traffic. Hearty indorsement was given to the efforts being made by various committees to find a method of stabilizing subgrades and of ascertaining the relationship of subgrades to traffic and road surfaces.

The resolutions committee consisted of Clifford S. Lee, director, Highways Information Service, New York City, chairman; George W. Tillson, consulting engineer, La

Grange, Ill.; Frank Page, state highway commissioner, Raleigh, N. C.; A. W. Dean, chief engineer, state department of public works, Boston, Mass.; H. G. Shirley, county engineer, Baltimore, Md.; W. A. Welch, chief engineer, Palisades Interstate Park Commission, New York City, and Frank Terrace, president, Washington State Good Roads association, Seattle, Wash.

President H. L. Bowlby appointed a committee to work out a plan of coordinating the location and dates for the next conventions of the American Road Builders' association, the Associated General Contractors of America, the American Society of Civil Engineers and the American Association of State Highway Officials. This committee consists of C. M. Upham, state highway engineer for North Carolina and secretary of the American Association of State Highway Officials; W. D. Uhler of the Pennsylvania State Highway department, and Gen. R. C. Marshall, Washington, D. C., representing the Associated General Contractors.

President Harding sent a message to the convention in which he said: "There is now a universal agreement that no single public improvement has done in recent years, or will do in the coming years, more for the general good of the country than the development of our highway system. The task is an enormous one, but better methods both in physical construction and in the relation of the community to highway development have been taking

form in a most encouraging way. Your own organization has been a chief contributor in this direction, and it is with much pleasure that I ask you to extend to its members my best wishes for their continued success."

In opening the congress President H. L. Bowlby predicted that the present generation will see the time when the United States will have the finest and most extensive system of arterial and tributary highways the world has ever known.

"It will be a system," he said, "of beautiful paved roads, properly located, adequately drained, splendidly shaded with trees, adorned in many instances with hedges and shrubbery and in other instances edged with sidewalks; lighted by electricity, kept in repair by working patrols and protected against highwaymen by squads of mounted state police. Grade crossings ultimately will have disappeared and it will be possible for tourists and others who traverse the highways to use them in greater safety. All of this will tend to make rural life more popular and will have a certain measure of effect in arresting the migration of so much of our rural population to the cities.

"I am sure we all wish to see American roads not only the most durable and the most beautiful, but the most economically maintained of any roads in existence. It is to be regretted that the beauty of our highways is marred by so many advertising signs. Many states have already led the way with legislation prohibiting them on any part of the

right-of-way. Advertising signs upon, along or adjacent to public highways serve no good purpose. On the contrary, they are nothing more or less than a public nuisance. They destroy the beauty of the landscape, impair the vision of motorists in dangerous places and add to the difficulty of properly directing and warning traffic.

"I desire to take this occasion heartily to indorse, as president of this organization, the recent action of Congress in adopting the policy of Federal aid for highways applicable to a definite system of interstate and inter-county highways, as provided by the Federal highway act,

approved by the President Nov. 9, 1921. I also wish to take this occasion to commend the present national administration for its positive stand for a system of roads adequately constructed and properly maintained. Fortunately for the country at this time we have in the White House a man who has long been a consistent advocate of good roads.

"While highway improvement has made tremendous strides in the United States in recent years, it is still in its infancy. Eighty-five per cent. of American roads are yet to be improved, but so great has the

interest in the subject become that it is not now so much a question of raising the money required to build good roads as it is a problem of spending wisely the large sums already available in every state for that purpose. Roads should be built not for a day, but for all time and they should be built not only with a view to creating a great national highway transportation system such as President Harding advocates, but with a view to full and complete coordination with all other transportation facilities, including the waterways and the railroads."

Urges Standardization of Varieties

SOME of the worth-while benefits that accrue to the manufacturer, wholesaler, retailer and consumer through standardization and elimination of excess variety in industry are enumerated in a report just issued by the Fabricated Production Department of the Chamber of Commerce of the United States.

"THE important role which standardization plans in industrial evolution is not generally appreciated. Here are some significant aspects of standardization, when carried out on a sound engineering basis:

1. "It enables buyer and seller to speak the same language and makes it possible to compel competitive sellers to do likewise.

2. "Better quality of product through ability of manufacturer to concentrate on better design and through the reduction of manufacturing expense.

3. "It lowers unit cost to the public by making mass production possible, as has been so strikingly shown in the unification of incandescent lamps and automobiles.

4. "By simplifying the carrying of stocks, it makes deliveries quicker and prices lower.

5. "It decreases litigation and other factors tending to disorganize industry, the burden of which ultimately falls upon the public.

6. "It eliminates indecision both

in production and utilization—a prolific cause of inefficiency and waste.

7. "It stabilizes production and employment, by broadening the possible market, and by making it safe for the manufacturer to accumulate stock during periods of slack orders to an extent which would not be safe with an unstandardized product.

8. "By focusing on essentials, it decreases selling expense, one of the serious problems of our economic system.

9. "By concentrating on fewer lines, it enables more thought and energy to be put into designs, so that they will be more efficient and economical."

EXPRESS COMPANY ORDERS ARMORED FLEET.

NEW YORK, March 15.—In an effort to lessen the many holdups of bank messengers and clerks who travel from banks to commercial

"It takes 'backbone' to tell your sales force, in these times, that you will cut your variety," the report says. "But it is being done not only by individual producers, but in entire lines through trade association cooperation. The Department of Commerce, with an eye to increasing our world's trade, also has a constructive plan to help those who desire help.

houses and vice versa, the Adams Express Company has ordered from the Reo Motor Car Company a fleet of armored body automobiles, mounted on the speed wagon chassis. These will be first put in operation in this city.

The body of the wagon has been patterned after an idea by W. M. Barrett, president of the Adams Express Company. The closed body of the car is lined with chrome nickel steel. It is bullet proof and has stood a test of steel jacketed .45 caliber naval type automatic bullets. Not only is the body bullet proof but the wind shield and windows are also made of a composition that bullets cannot penetrate. In the body of the wagon are eight port holes and the guards are equipped with automatic rifles.

Another feature of the car is that though the inside guard is completely isolated from the driver there is a lever attachment that gives the guard complete control of the car in case the man at the wheel meets with accident.

THE MOTOR BUS FIELD

*A DEPARTMENT DEVOTED TO THE
INTERESTS OF MAKER AND USER*

MANUFACTURE — DISTRIBUTION — OPERATION — DEVELOPMENT — NEWS

Saginaw Citizens Favor Bus

Special Canvass Shows Majority Want Motor Transport
New Company Plans to Operate on Five Cent Fare
Charge—Street Cars Inadequate.

(By C. H. JENKINS.)

TWO cities in Michigan offer great opportunities to the motor coach builder of the United States to prove the contention that street cars are nearing the end of their usefulness in major size cities—that the gasoline propelled vehicle is about to supplant the electric trolley car as it supplanted the horse drawn car of years ago.

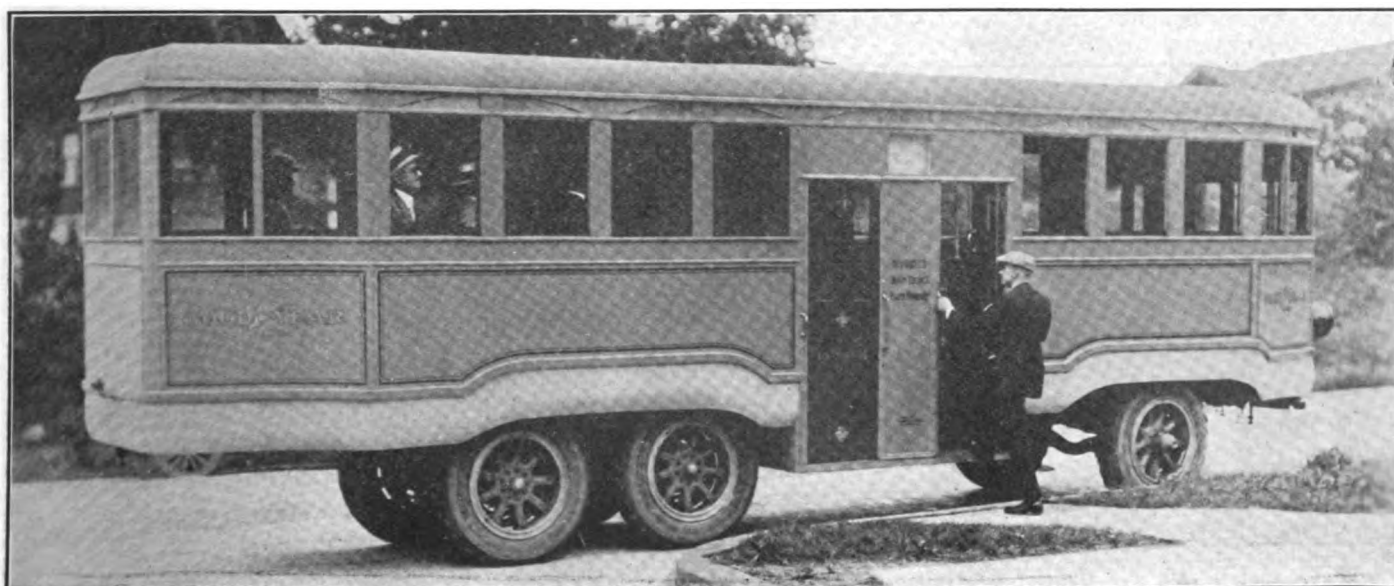
THESE two cities are Saginaw and Bay City, both of which are awaiting the day when real motor coaches operated by financially responsible companies will establish a regular system of street transportation satisfactory to the former car riders, manufacturers, theater own-

ers and business men.

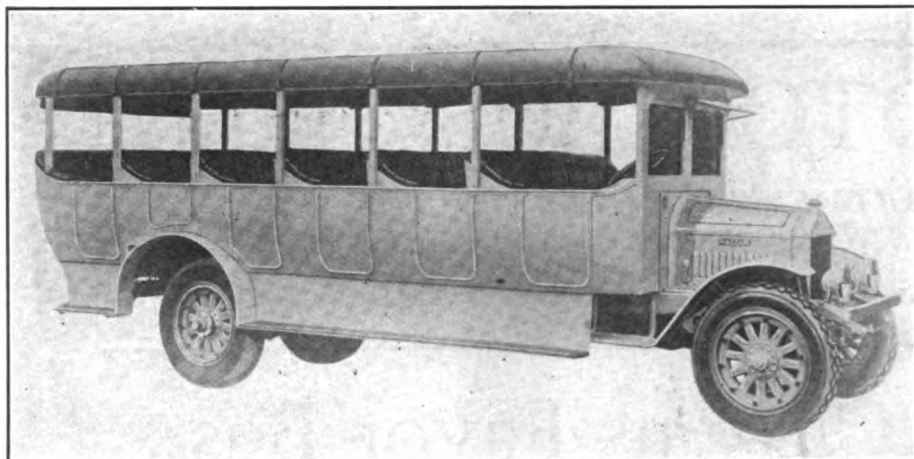
Both cities face the same conditions. An account of one fits the other by a substitution of names, with the exception of the control of so-called jitney busses upon which both have depended for service since Aug. 10 of last year.

The Saginaw Bay City Railway Co. formerly operated the city street cars in Saginaw and Bay City. Since labor and costs have mounted within the last few years, however, the company has been hard pressed to maintain service and equipment. Strikes by employees tied up the systems and no effort was made by the company to secure other men to operate the cars. Efforts to secure

increases in fare in Saginaw met with success but once, when the people voted an increase from a five to a six-cent fare. Last July a "ride-at-cost" franchise was submitted to the electors of both towns, only to be defeated when the electors were given an opportunity to express themselves. The company officials announced before election day that unless the franchise was carried the company would be forced into bankruptcy by its creditors as they were forced to pass the interest payment on \$750,000 worth of bonds. The election took place July 19 and on Aug. 9 the creditors filed a petition in the United States court asking for the appointment of a receiver.



Type of Motor Bus That Is Being Used to Good Advantage in Akron, O.



Popular Type of Maccar Bus Much Used in Urban Transportation.

This was done and since Aug. 10 not a street car has moved in either city.

Prior to that time jitney busses operated on the best lines and as a result took the cream of the business. The owners worked during the peak hours and when traffic fell off they stopped running only to start when traffic again was heavy.

When the cars ceased operating, jitneys from various parts of the state came into Saginaw to give service, and soon afterwards the owners, numbering about 50, banded together under the name of the Saginaw Motor Bus Association as a non-profit corporation. They elected officers and attempted to give service. Whether this has been successful depends upon how it is viewed. A majority of citizens, when an advisory vote was taken Dec. 7, said they preferred busses to street cars. Ask anyone who voted against street cars and he will tell you he is not in favor of jitneys, but wants motor coaches. As to the

rate of fare, five cents is the limit, although hundreds of people riding the jitney busses are forced to pay 10 cents because transfers are not issued.

Until Dec. 7 the city council had done nothing to help the street car situation and it is a matter of record that they encouraged the jitney owners in the competition.

After the December election the Saginaw United club sprang into existence. The club's policy is "a better Saginaw." The officers assert the thing most needed is suitable transportation, stating that the jitneys are only a make shift and are temporary. This is the way the club looks at things and its officials are now ready to attempt the financing of a motor coach system. They have gone farther than a bus operator would in learning the facts. An investigation has just closed and the club records will show where every working person lives, the time he goes to his work and home again,

and what route he takes. As a result of this mass of information a traffic flow map has been made which the officers say is so accurate that if the operating company which they propose to organize is successful it will carry passengers for a five-cent fare in a real motor coach and give transfers good for all other lines.

Rerouting from former street car lines in which the longest haul is reduced to about $3\frac{1}{2}$ miles and carrying 11,000,000 passengers annually will permit of the five-cent fare they say. Since the club has been working on its plan traffic men from various motor coach manufacturing companies have been here assisting in the work. They want to see the plan go through for if it does Saginaw will be the first city of its size in the country to be motorized. Of course for the last six months Saginaw has depended entirely upon jitneys, but no citizen would "point with pride" at many of the busses. They have been described as "corn cribs on wheels," which appellation well fits the majority of them. They have been poorly managed and two weeks had not passed when it was very evident it was impossible for the city council to deal with 50 individual owners and get anywhere, and as a result the jitneys have run the city's transportation to suit themselves.

It is practically certain that street cars will never come back. The company has no franchise and the people have been against the organization for years and obviously would not vote a franchise no matter how favorable it might be to the people.

Within the next week or 10 days the United club will make an effort to sell stock in its company. It will probably be capitalized at \$500,000, and it is generally believed it will take 40 busses to properly serve the city.

If the club is successful in disposing of the stock an order will be placed with some company for the motor coaches to be delivered not later than May 1, which is the beginning of the license year of the



School Busses Are Rapidly Centralizing the Country Schools.

(Continued on Page 134.)

Rail Car Saves Money

Recently Developed Mack Unit Carrying 23 Passengers
Emphatically Proves Economy and Utility of Gasoline
Bus—Closely Approaches Speed of Locomotive.

FOSTERED by the executives of the Northern Pacific railroad in cooperation with W. F. Sailor of the International Motor Co., several trial trips were recently made of a new type of passenger carrier which, it is said, may revolutionize rail transportation on branch line runs. The vehicle which is arousing such unusual interest among leading railroad officials of the country, is a specially designed Mack gasoline rail car mounted on steel flange wheels so that it can be

operated on standard railroad tracks.

The experimental trips were made over the Northern Pacific route from St. Paul to White Bear, a distance of about 12 miles. This run includes a steep and winding grade almost two miles long, one of the most severe in the northwest. When it is understood that two locomotives are required to pull a passenger train up this ascent, some idea of the severity of the test may be ascertained.

SUCH great importance was attached to the first trip that possibly the largest assemblage of big railroad men of the northwest were present to take part in the initial tryout over the White Bear route. Prominent among these officials were Charles Donnelly, president of the Northern Pacific; Ralph Budd, president of the Great Northern; J. M. Hannaford, vice chairman of the Northern Pacific; W. T. Tyler, vice president of the Northern Pacific; William Genlo of the Minneapolis & St. Louis; A. R. Kipp of the Soo lines; W. L. Luce, president of the Electric Short Lines, and J. J. O'Neil, general manager of the Chicago, St. Paul M. & O.

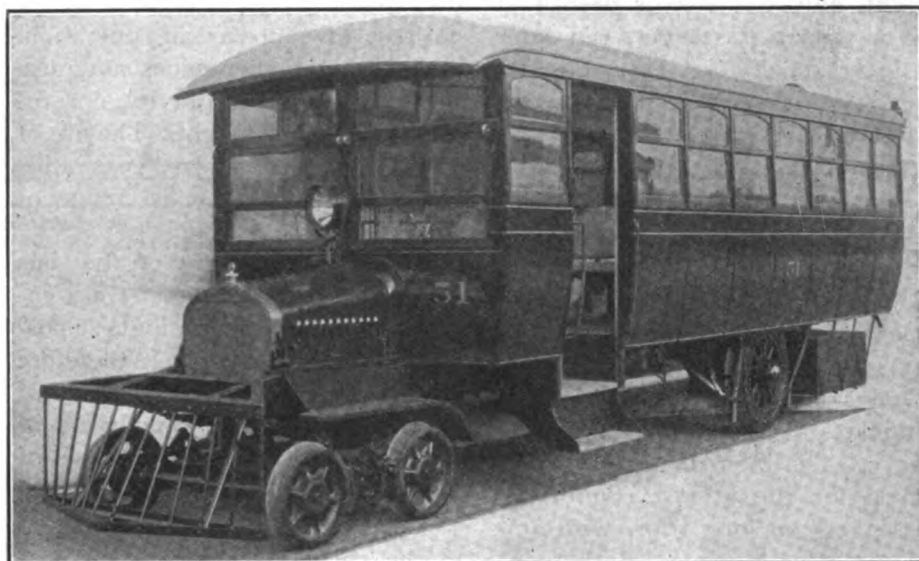
Twenty-three passengers were comfortably carried on the first trip, although the rated capacity of this motorized rail car is 17 persons in addition to a baggage compartment. The rail car, watched by a long line of autoists who had assembled along the route, quickly climbed the steep, curved incline, and completed the run of 12 miles to the entire satisfaction of every one of the railroad officials, who enthusiastically discussing the performance they had just witnessed, gave an unanimous opinion that the experiment proved beyond a doubt that motorized carriers, properly equipped, can be used to profitable advantage in certain phases of railroad service.

When a second trip over the same route was made a few days later the distance was covered in 29½ min-

utes, only 4½ minutes longer than it takes the Duluth limited train to make this run. Obviously, a small motor bus could not be expected to save time when competing with steam equipment, yet the railroad

continue service or will soon be compelled to do so because the expense of operating steam equipment far exceeds the revenues obtainable for the service rendered.

One of the results of these tests



This Mack Rail Car with J. C. Brill Body Has a Capacity of 23 Passengers.

men who have carefully considered operating costs, strongly believe that gasoline rail cars will effect a more vitally necessary saving—that of operating expense. Moreover, even under the most unfavorable conditions for running a gasoline car, it has been found that the costs are much lower than those of steam operated equipment. This saving in operating costs, combined with the comparatively small capital investment required, promises to be the salvation of many branch lines, some of which have had to discon-

has been a radical step away from established railroad precedent recently taken by the Northern Pacific. A number of years ago when James J. Hill, one of the foremost railroad men of his time, ran his first locomotive out of St. Paul, steam equipment was looked upon throughout the country as being the only logical answer to transportation problem of the rapidly expanding northwest. Today, his successor, Charles Donnelly, the present head of the Northern Pacific, is turning

(Continued on Next Page.)

Meets Specific Demand

New White Model Recently Put in Operation Designed
Solely for Bus Service—Special Chassis and Bodies
Developed for Passenger Transportation.

A SPECIAL type of motor bus having new features of design which are important in passenger transportation, has been brought out by the White Co. of Cleveland. The new design is one of the first in which both chassis and body have been developed especially for bus work. It gives railway companies and bus companies the advantage of using equip-

ment that exactly fits the requirements of bus operation.

Regular models of motor trucks have been successful in bus service, but the rapid development of passenger transportation by motor bus and the use of the bus in new classes of service have brought out many new operating problems which many believe are met best by special design.

THE new model has a wheelbase of 198 inches, making it possible to mount, without excessive overhang, a body which has comfortable seats for 25 passengers. Long and flexible springs, a low center of gravity and the long wheelbase, combine to make riding easy. Because of its low loading height, only one step is needed at the entrance. Passengers can enter or leave rapidly so that stops are short and fast schedules can be maintained.

Two types of bodies have been designed for the bus chassis—one known as a city type and the other an interurban type. Operating companies, however, may use other types of bodies when desired. The city type permits of great freedom of movement about the interior and eliminates "choking" at the entrance. The interurban type is designed for the utmost comfort of passengers on long trips, with ample space for luggage. Both types have wide double doors at the front and an emergency door in the rear.

Modern heating and ventilating systems are installed.

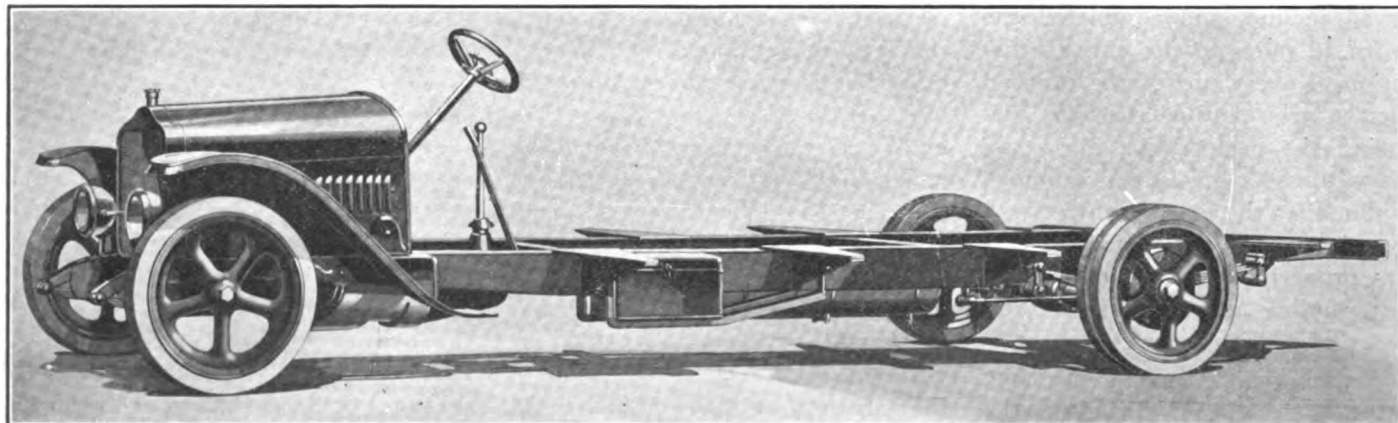
Standard equipment includes generator and electric lights, side braces on the frame, steel wheels and solid tires, single in front and dual in rear. This tire equipment is especially adapted to operation on city streets. Pneumatic tires and disc steel wheels can be furnished if desired for interurban operation. This tire equipment does not raise the low center of gravity nor increase the frame height. The use of various optional standard gear ratios makes possible a wide range of speed and acceleration.

In the manufacture of the bus chassis the White company has endeavored to give it the highest possible earning capacity. It therefore retains every feature of ruggedness which has enabled hundreds of White busses to roll up records of 100,000 to 300,000 miles each.

(Continued from Preceding Page.)
to the gasoline engine as an economical solution to one form of this transportation problem—short haul

passenger traffic—which has never been profitably solved by the conventional railroad equipment. Convinced of the advantages of gasoline motor cars, the Northern Pacific now operates a Mack rail car in regular service on a branch line, and expects shortly to install more of these cars in like and larger capacities. Another big railroad of the West, the Great Northern, is also planning to install gas-propelled rail cars on its branch lines.

In the East the New York, New Haven & Hartford railroad operates three such rail cars. Many of the smaller railroads, such as the Narragansett Pier railroad, Aberdeen & Rockfish railroad, Sewell Valley railroad and Stone Harbor railroad have been successfully using motor equipment for some time. In fact the internal combustion engine has saved certain of these smaller railroads from the scrap heap in the opinion of men who understand the conditions which have led to the adoption of the gasoline rail car.



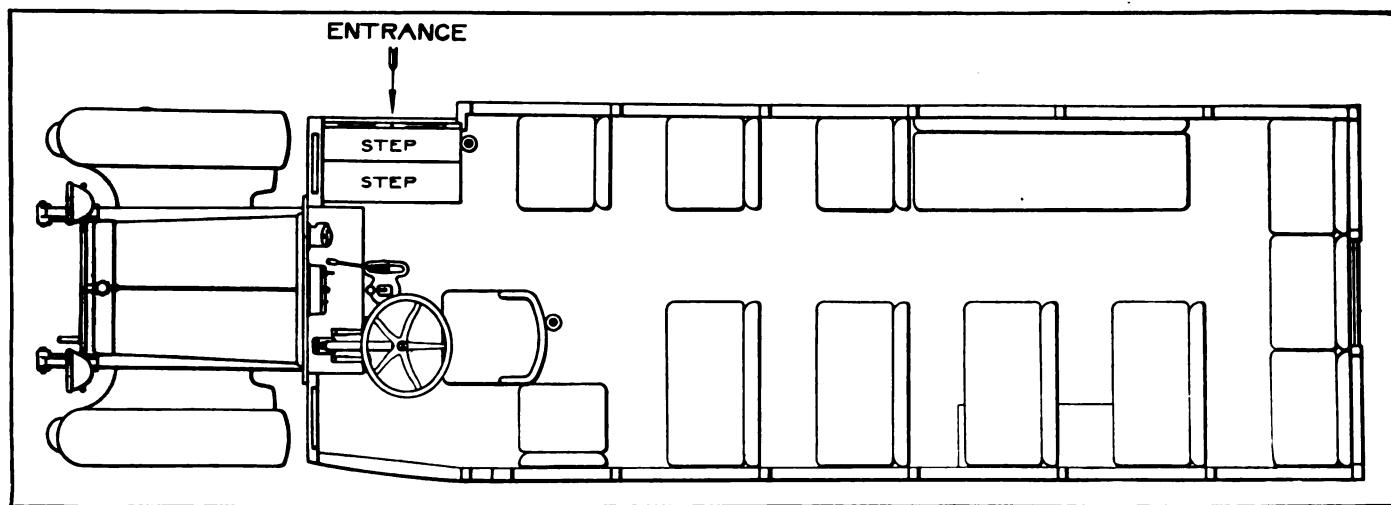
Special White Bus Chassis Recently Developed for Use in Intercity Service. The Wheelbase Is Nearly 17 Feet.

Builds Special Bus

General Motors Company After Long Period of Research
Develops Motor Carrier That Embodies All Features
Necessary to Economical Operation.

EMBODYING several new features particularly designed and fitted for motor bus work, together with many other distinctively GMC points, the new GMC 20-passenger motor bus, just announced by the General Motors Truck Company, offers another unit of transportation in the bus field. By combining a long wheelbase with exceptionally long and flexible semi-elliptic springs, perfect riding qualities

are said to have been given the chassis, as well as a balance which makes uniform easy riding, regardless of passenger load. The body, which is extremely roomy for its capacity, overhangs the frame but slightly. Bouncing, sidesway and whipping, which are occasionally encountered in certain types of busses, is stated to be overcome by the long wheelbase and the fact that the frame overhangs the rear axle only a few inches.



Floor Plan of Newly Developed G. M. C. Bus Body. By Combining a Long Wheel base with Special Spring, Passenger Comfort Is Gained Through the Elimination of Bouncing Side-Sway and Whipping.

THE manufacturer states that the power plant is more than ample for a road speed of 30 miles an hour to which the bus is governed and also to furnish pulling power for bad grades and unimproved roads. In test the bus, fully loaded, was driven at 25 miles an hour up a four per cent. grade on high.

The power plant is of GMC design and manufacture and embodies all of the GMC features of construction such as removable cylinder walls, removable valve lifter assemblies, pressure lubrication, dual cooling, superheated carburetion and instantaneous and positive fly ball governor. All of these are said to be particularly well adapted to bus work since their design is to increase economy of operation and reduce both time and expense of replacements and adjustments.

The bus body for this new equip-

ment is furnished with two seating arrangements, one adapted particularly to interurban bus operation and the other designed for city passenger work. The body is staunchly built of oak, reinforced with metal and is finished outside in smooth paneled surfaces which take a fine paint job and present a lustrous finish.

Because of the general narrowness of roads all through the country the bus has been built to a width of 74 inches and by an ingenious seating arrangement no comfort or balance has been sacrificed.

The interior of the bus is finished in paneled oak with rattan seats. It is complete in every detail, including non-rattling adjustable windows, complete buzzer signal system, front entrance door controlled from driver's seat and rear emergency door. Special attention has been paid to the front door design.

The step is low and broad, making it particularly safe against accidents. Rear vision mirror, dome lights and advertising card rack are among other refinements.

The bus rides on 36 by six cord tires all around. One other new provision, which is of special GMC design, is the fuel tank, located outside, and filled from there without inconvenience or fire risk. A vacuum system carries fuel to engine.

The bus is driven through radius rods and by a bevel gear axle, and is furnished with extra large brakes. Interchangeable brake rods make it possible to use both internal and external sets for service and the radius rods absolutely insure perfect braking, regardless of load, as the rear axle remains in fixed position.

In addition to the two styles of body the bus chassis will be sold alone in cases where special body equipment is demanded.

Thomas Designs Reo Taxi Chassis

Latest Product of Prominent Engineer Is Known as Model
"V"—Combines Best Units of Reo Passenger
Car and Speed Wagon.

DESIGNED and built expressly for taxi service, a chassis, to be known as Model V, has been announced by the Reo Motor Car Company. A casual survey of its many strong features reveals it as a vehicle particularly adapted for the work it is intended to do. H. T. Thomas, chief engineer of the Reo plant, is enthusiastic over his latest contribution to the Reo line, and predicts a great future for it. His confidence, he states, is founded on the established correctness of the mechanical principles employed and on the

thorough and efficient manner in which the various working units have been developed. Foremost among the qualifications necessary for successful operation in taxicab service are the durability and stamina that will resist hard usage and rough travel, supplemented by reasonable speed, quick and dependable self-starting, quick pick-up and ample spring resiliency. Economy of operation and particularly economy of maintenance are also vital factors. The Reo has always enjoyed an enviable reputation for these qualities.

BEING a combination of the best units of Reo passenger cars and Reo speed wagons, and mounted on a frame especially designed for taxicab work, the new Reo model enters the field as a thoroughly tried and tested job and is stated to be entirely free from experiment. Each unit taken from the passenger car line has made good in many thousands of cars now in service, and every unit coming from the speed wagon has been demonstrated by the 60,000 jobs that "deliver the goods quicker and cheaper" for practically every line of industry.

"The facilities of the Reo plant make it a logical producer of a chassis for taxi service," says R. C. Rueschaw, general sales manager. "Practically everything entering into the mechanism of Reos is made in our own plant from designs worked out by our own engineering department. We are entirely free of dependence on others for

either quality or workmanship. And as all the taxi chassis units will but augment current production, they are not burdened with any creative experimental expense. On the other hand they at once receive the benefit of quantity output. And therein lies the secret of the very low price which has been made on the job.

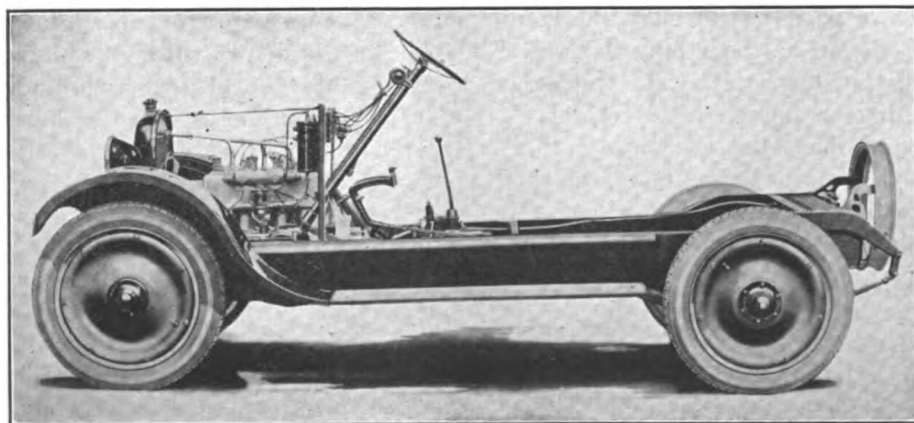
The wheelbase of the new chassis is 113 inches, which is seven inches shorter than the touring car, and 15 inches shorter than the speed wagon. Turning radius is 19 feet. The engine is the four-cylinder speed wagon motor engine that has made such a marvelous record for both speed and power. It has 4 1/8-inch bore with 4 1/2-inch stroke; cylinders cast in pairs with head integral. Transmission is of selective type, equipped throughout with high duty Hyatt roller bearings. Clutch is multiple dry disc type with 13 steel plates. Rear axle is full floating and employs large Tim-

ken bearings. Steering gear is adjustable bevel gear and internal sector and pinion type. Springs are two inches wide, being 38 inches long in front and 54 inches long in rear. Wheels are disc steel, carrying 33 by 4 1/2-inch Royal cord non-skid tires. Electrical equipment includes starters used on Reos for many years. A sub-frame carries all important working units, thereby relieving them from road stresses and strains.

(Continued from Page 130.)

city government. jitney operators are required to take out a license and the council feels it should permit them to complete the year, having paid for the right. The council will pass a revocable ordinance governing the operation of the proposed system. After it has been in service for some time and it has been demonstrated as successful and satisfactory to the public, it is planned to submit a five-year franchise to the people.

The outside traffic men who have been working with the club officers all urge the purchase of a good substantial vehicle built to withstand hard usage, saying that with cheap, poorly built ones the mile cost will be so great that the rate of fare will have to be increased to a point where the riders will be reduced to a minimum, thus causing the venture to fail—all of which is particularly sound logic and worthy of careful consideration.



Durability Is Expressed in Every Line of This Rugged Chassis.

Motor Trucks Reduce Prices

(By W. A. KNUCKEY, Chairman Executive Committee Truck Division, Motor Car Dealers' Association, San Francisco, Cal.)

WHAT is the future of freight highway transportation? There probably have been several thousand answers to the question. There are so many angles, and so many elements to the problem, that it would take almost a book to say them all. There is only one definite answer beyond contradiction. It has come to stay! And it is going to grow larger from year to year. The reason for this is

THE slow-going freight car gave way to the express train for two reasons—because transportation was quick, and, secondly, because the express company undertook to deliver directly to those who were going to sell it, and it saved handling, and handling means damage—but delivery by the express company fell short in one thing.

The farmer who lived five miles from the railroad could not spend half a day taking in a crate of berries or 20 gallons of milk. He sold it locally at a lower price, or fed it to the hogs. This was an economic waste and the consumer had to pay. The consumer always has to pay.

Automobile trucks move quickly, are fairly economical and small units have come to replace the express. The life of any metropolis today is almost dependent upon the automobile truck.

The truck driver loads and unloads his truck. At most there are but two handlings. The express company faces two truck hauls, one to the express car and one from the express car to the merchant—four handlings. There is occasion for delay every time the goods have to be handled, which, in a highly perishable article, is likely to see the produce spoiled before it reaches its destination.

The express company must carry all kinds of commodities. The employee who is not personally interested is not always as careful as he might be. The unit is flexible and can be multiplied indefinitely.

If there is a tomato crate to be moved quickly, trucks can be produced, and with almost no wastage.

As soon as they are loaded they are on their way and into the cannery. If transported by freight the same tomatoes will have to be hauled to a car siding and held until a full car load or substantially that is obtained, and then moved and have to stand again until all this car load can be unloaded.

Actual statistics show that only three years ago 50 per cent. of the perishable produce raised by the farmers of the nation spoiled in the field, or was destroyed in transportation. This is an economic waste, and the consumer has to pay for it.

Did you ever stop to realize that San Francisco could get its fruit, vegetables and its milk for 60 to 70 per cent. of the present prices if it all could be used? How many millions a year does that mean to San

Francisco? It serves a public necessity, and has come to be an economic factor in our work-a-day life. San Francisco, like every other metropolis hemmed in by an environment of residential territory, is compelled to depend upon more distant fields for daily necessities. We must have milk, fresh fruit and vegetables. They must be brought to us fresh every day. They are intensely perishable, and for most part must be handled carefully.

Francisco?

This does not mean that the railroads are not necessary, or that the express companies will cease to do business. They will probably continue to do as much, if not more, in the future than they have in the past—but the truck will do what they cannot do, and do it for an economic betterment, and by doing it save the ultimate consumer millions a year.

Strictly speaking, the automobile truck and the railroad carrier ought not to be competitors. Each has its own field, each its own public convenience and necessity, and each working hand in hand with the economic development of the community.

When it comes to internal delivery, horse-drawn vehicles are rapidly becoming out of date in all of the more important cities. They are slow, and in these days when traffic is becoming more and more congested, the slow-moving vehicle simply serves to congest traffic more and more. They are uneconomic because the grain that one horse eats will keep five people. The motor truck uses what nobody can eat.

It does not consume human sustenance, and therefore conserves certain national resources. From the point of view of the individual owner and user, it represents an economic individual unit, which is at all times flexible, is only an expense while it works, does not require constant care, as a horse, and is susceptible of perfectly definite profit-earning calculation before the investment is made. In the smaller units it is quick moving, and there-

SERVES TWO PURPOSES.

THE truck serves two purposes—what is commonly known as highway transportation, that is, transportation over the highways of the adjoining country, and internal deliveries.

Highway transportation does not mean cheap rates, but public convenience. The truck in a small unit picks up its load at the door of the producer, transports it to the metropolis and delivers it to the door of the merchant, who in turn sells it to the consumer. Transportation is quick and, therefore, a smaller risk of wastage in transportation.

fore insures service, can be operated in any conditions of weather, and is therefore always a ready servant.

The people of the State of California at a tremendous expense have built a system of highways as extensive and as complete as those which kept together for three centuries the Roman empire. These highways were built to serve the public and for the benefit of the poor man who could not afford his own automobile. Any benefit that the poor man is to derive from these highways, and his money is surely invested in them, is going to be derived through quick and economic transportation—transportation for freight and transportation for passengers. Freight means a benefit to him because it will cheapen his product. Transportation for passengers is a direct benefit to him, because the stage will carry him to outlying districts when he wants to go where there is no railroad available. He is entitled to this return on his investment. He is entitled to the use of the road he has helped to build. It was never intended for a speedway for the more fortunate who could afford automobiles.

To the man who must of necessity, in the course of his business, travel from place to place, the highway represents interest on his investment. It not only enables him to go quickly to his business, but saves him time waiting for trains. It allows the merchant to enlarge the scope of his activities and to reach customers heretofore considered beyond the zone of his effort.

Highways must be maintained and their number increased.

San Francisco is peculiarly situated geographically. With water on three sides and one highway on the fourth, how is San Francisco to realize upon the tremendous investment that has been made on the state highway unless it can use these highways? How is the merchant of San Francisco to reach into the new territory over the highways if he must be forever forced to curtail his activities down one highway already congested beyond its capacity.

The trucks have come and they

Willys Relinquishes Republic Control

**Management Now Permanently
Centered in Alma Around
Present Organization.**

ALMA, MICH., March 12.—At a directors' meeting of the Republic Motor Truck Co., Inc., held in New York City on Friday, Feb. 24, the resignation of all officers and directors of the company were tendered for acceptance at the pleasure of the board.

are daily increasing in volume because they have come to be recognized as a public convenience. Trucks are substantially possible because of our splendid highways.

Is the economic development of our great state to stand aside with all the facilities at its hand, for want of a highway to get out of the city? More roads, wider roads, better roads must be constructed. San Francisco must grow, and it can only grow so far as transportation and economical development is concerned, when it has more facilities to connect with the splendid system of highways constructed at the public expense, for which San Francisco is helping to pay.

EATS WHILE IT WORKS.

THE horse eats whether he works or not. The truck only eats while it works. The truck which will move 12 miles an hour, a safe speed for any load, is still going three times as fast as the horse-drawn vehicle. It does three times the amount of work, and is out of the way of the traffic. In other words, three trucks furnish no more traffic on the streets than one horse-drawn vehicle.

From the point of view of the general public, the truck therefore is an economic factor, which saves wastage and therefore tends to reduce prices. It saves labor, and therefore tends to reduce prices.

It is understood that this action followed the passing of control of the company from eastern interests, headed by Mr. Willys, to western interests centered in Michigan and Illinois.

The resignation of John N. Willys as president and director of the company, of Walter P. Chrysler as a director and member of the executive committee, and of James E. Kepperley as a director were accepted, and Col. Frank E. Smith was elected president, succeeding Mr. Willys, and Messrs. O. W. Hayes, H. D. Minich and Charles G. Rhodes were elected as directors in the places made vacant by the



Col. Frank E. Smith, President of Republic Motor Truck Company, Incorporated.

resignations of Messrs. Willys, Chrysler and Kepperley.

Both O. W. Hays and H. D. Minich were made vice presidents of the company, and Charles G. Rhodes was elected secretary.

The resignation of H. I. Shepherd as treasurer of the company was accepted, but he will continue as a director, as will also W. J. Baxter, until their successors can be determined upon, at which time their resignations will be accepted by the board.

These changes bring back to the West the control, which was transferred to New York at the time Mr. Willys and his associates purchased the stock of the company from

(Continued on Next Page.)

Trailmobile for Fordson

A NEW opportunity that may result in greatly increased sales of Fordsons and an accessory with profitable sales possibilities in itself, is offered in the Trailmobile for the Fordson tractor.

The tractive power of the Fordson is well known to all Ford dealers. How best to utilize that power is dependent upon proper trailers and suitable wheel equipment for the tractor.

SPECIAL rubber tired wheels of different makes already are on the market. The Trailmobile Company of Cincinnati, after an exhaustive study of the problems presented, has developed the semi-trailer, shown in the accompanying illustrations, especially for the Fordson tractor.

The carrying capacity of the model illustrated is $2\frac{1}{2}$ tons. It is made in two heights, namely, with 22-inch wheel and 27-inch height from ground to top of platform, and with 32-inch wheel and 38-inch height from ground to top of platform.

The low platform trailer is especially convenient for the Fordson dealer's own use in making deliveries of tractors, plows and other implements, and also is handy for certain industrial conditions and those cases where the shipper has an unusual low loading platform; or perhaps no platform at all.

The higher platform model with 32-inch wheels is quite generally adaptable to miscellaneous hauling conditions, such as factory shipments of general merchandise, delivering wholesale groceries and hauling heavy machinery, for deliveries of structural iron work, contractors' materials, farm products, lumber and similar commodities.

This trailer is of the general type known as a semi-trailer in which the tractor carries a portion of the load. This is highly desirable for several reasons, first, this weight gives traction to the driving wheels without necessitating a specially loaded wheel. Second, the entire



Trailmobile Drawn by Fordson Equipped with Large Pneumatic Tires.

outfit is more compact than a four-wheel trailer, and third, it is easily manipulated, turned and backed.

The trailer carries most of the load; but about 30 per cent. rests on the Fordson in such a way that the traction is greatly improved. A special bridge casting distributes the weight to the hubs of the Fordson tractor—no weight is carried on top of the worm gear housing. Thus the necessary road traction is secured and without any injurious effect on the Fordson. This load on the tractor is carried directly over the center of the rear axle of the tractor. The drawbar of the trailer attaches to the regular Fordson hitch. The draft is horizontal from the regular Fordson hitch.

This combination of sustaining the weight directly over the axle, but of pulling horizontally from the regular tractor hitch means that there is no tendency whatsoever toward lifting the tractor off the ground. There is a further safeguard against the front of the tractor lifting under extreme conditions by the slot in the upper or weight sustaining bar of the Trailmobile, the end of which would act as a stop for the pin in the bridge if the front end of the tractor should start to raise.

This new Trailmobile does not require any alteration whatsoever in the standard Fordson tractor except, of course, rubber tired wheels, which are always used for road

work. It is usable with any such wheel equipment.

Special attention has also been given in developing this trailer to facilitate of coupling to and detaching from the tractor. A hinged prop is attached at the front of the trailer to support the trailer when it is parked by itself in the absence of the tractor. The bridge casting, which comes over the worm housing of the tractor, has an inclined skid projecting toward the rear. To couple the Fordson to the Trailmobile all that is necessary is to back the Fordson under the forward projecting arm of the Trailmobile.

(Continued from Preceding Page.)

Messrs. Burt, Rhodes, Moore, King and their associates in Michigan.

It is understood the relinquishment of control by Mr. Willys is occasioned by his having so many other interests, particularly Willys-Overland, which will take practically all of his time and attention in future.

The executive officers of the Willys-Overland company and other Willys interests are being closed and all of Mr. Willys activities will be centered in or about Toledo.

H. I. Shepherd, who has been associated with Mr. Willys in a financial way, in connection with many of his companies, is reported to be joining the organization of one of the large Cleveland banks.

Note Gradual Improvement

Sales Reported Better at Quarterly Meeting of Motor Truck Members of N. A. C. C.—More General Use of Caution Plate Urged.

AT THE quarterly meeting of the motor truck members of the National Automobile Chamber of Commerce today reports on sales were made which showed that the truck business was improving gradually. In Chicago truck sales had increased 25 per cent. January production was 38 per cent. better than December.

AT THE general meeting of the truck members it was unanimously voted to adopt the recommendations of the Truck Standards Committee as follows:

1. That the standard caution plate adopted by the chamber in 1912 is more suitable for present requirements than any other form of plate.
2. That a more general use of this plate should be made and that the space provided for weights ac-

tually should be filled in.

3. That the manufacturer should recommend to the state motor vehicle commissioner that no license be issued for a motor vehicle unless weights are properly filled in on plate at time of application.

R. O. Patten, manager, truck sales division, Pierce-Arrow Motor Car Company, proposed that truck sales questions and answers be standardized to give the buying public a more rounded viewpoint of truck utility. It is expected that many of the members will follow out this suggestion.

It was reported that the American Electric Railway Association has been giving considerable study to the possibilities of the motor bus. The New England Street Railway Club already has recommended to its members that motor bus service is

preferable as an auxiliary in many instances. This is believed to definitely mark the turning point of the electric railway industry in favor of busses.

Facts presented by F. W. Fenn, secretary, to the members of the Automobile Club of Canada at Montreal and to the ministers of highways and finance at Quebec resulted in the drawing up of a new bill to permit a maximum dead weight (vehicle and load combined) for any truck of 24,000 pounds.

The N. A. C. C. will soon issue a booklet on driver civility. It was felt that a more general understanding of the courtesies of the road would bring about fewer accidents and impress upon motor truck drivers the importance of yielding the right of way to faster moving vehicles.

Power Driver Does Work of 20 Men

The "big tops" are going up faster since the W. A. Plummer Manufacturing Company of San Francisco, designed a special White truck body equipped with a power stake driving device. Its efficiency in erecting tents may be judged from the fact that the power hammer will drive five tent stakes in

the time it ordinarily takes four sledge slingers to drive one.

The stake driver gets its power directly from the main drive shaft of the White truck. The hammer operates in a cylinder of steel. By means of a friction clutch which is engaged at will by the operator the hammer is raised into striking posi-

tion. Simply disengaging the clutch permits gravity to take care of the blow. It is geared fast enough to allow an experienced workman to strike 30 blows a minute with a force ranging from 300 to 1000 pounds.

In addition to the stake driving feature there is a vertical gypsy head that is also connected to the main drive shaft, which is used in connection with block and tackle in raising center and quarter poles of tents. This equipment enables the White to handle the work formerly done by a team of horses that had to be picked up on the job.

There are various compartments on both side of the truck for tools, stakes and the workman's clothes.

Two powerful searchlights in addition to the truck's regular equipment makes it unnecessary to call time on account of darkness.



This Power Stake Driver Makes Tent Raising a Sinecure.

Cost Sheet Is Time-Saver

Garage Superintendent for Big Packing House Finds Delivery Chart Valuable Factor in Economical and Efficient Operation of Truck Fleet.

"BACK in 1909, when I was made garage superintendent of the Boyd-Lunham Company, Chicago packers, if anyone had told me some day I'd be drawing maps of our delivery system, I certainly would have got a big laugh out of it," said Ray Jones, the company's garage superintendent.

THE idea of being able to tell it cost 35 cents to haul a ton of produce a mile with our size ED trucks, and 39 cents with size EC would have been still funnier. All we were interested in those days was getting the material to its destination. That kept us satisfied and allowed no time to figure costs.

"Now we've got things figured out like a time table. One of our size ED's has covered over 75,000 miles since 1914. Another of the same capacity has done 57,062 miles in four years at a cost of less than \$100 for repairs.

"We've got a garage with two expert mechanics, a lathe, two drill presses, grinder, hot and cold water, high and low pressure compressed air, various other conveniences and plan to add a paint shop. Our loading is done from three platforms, one for wholesale, one retail and one for green and salt meats.

"Just take a glance at this chart showing our delivery radius with teams compared to trucks," continued Jones.

"All very simple," he added, "yet I know of people, some of them friends of mine, who are still struggling over their transportation problem."

The eight Boyd-Lunham trucks deliver the company's pork products to wholesale and retail meat markets over a territory from Kenilworth on the north to South Chicago, and from the lake on the east to Oak Park on the west. No one

truck is assigned to any special job, each being routed according to daily orders.

The company, according to Mr. Jones, has divided the day into two deliveries called "Early" and "Late." The early delivery is to the wholesale dealers. The trucks load for this from 5:30 to 6 o'clock each morning, pulling out on schedule at the latter hour. When they return from this trip they load for the retail butcher routes.

ent can locate any one he may wish within 15 minutes, tell the driver what is wanted and know that it will be done. This is also useful in another way. It permits checking up on the trucks to see that there are no unnecessary delays.

One truck is held in reserve daily to haul to and from the freight houses or to do any other special work which may require immediate attention.

If it were possible the trucks



Section of Capable Packard Fleet Employed by Boyd-Lunham Company.

Each truck is loaded according to the orders which have been received. The Boyd-Lunham Company has a route card which is made up for each truck every day. The original of this is retained by the garage superintendent and a carbon copy given to the driver. Deliveries are made on the outbound trip. The meat for customers located nearest to the plant goes on the truck last, and so on until when the truck reaches the last customer, at the furthest point it gets from the stock yards, it is empty.

This permits the use of the truck to pick up a load which may be coming back to the plant. This is one of the advantages of the route card. With the stops the truck is to make before him, the garage superintendent

would be assigned to regular routes, but owing to the nature of the business this is not possible.

STORE-DOOR DELIVERY IS RAILROAD PLAN.

BALTIMORE, MD., March 12.—The Merchants and Manufacturers' Association has been informed by the Pennsylvania Railroad Company that a plan for motor truck distribution of freight is under consideration for that city. It is the belief of Robert C. Wright, general traffic manager of the Pennsylvania, that the vast volume of less than car load traffic congests the rails of the terminals and interferes with the proper handling of car load traffic.

Rebuilding The Storage Battery

Intricate Problems of Overhaul Simplified—Design, Construction and Operation of Important Unit Explained in Detail by Prominent Authority.

(By WILLIAM DEVLIN.)

BATTERY service stations are maintained by manufacturers of storage batteries in practically all large centers of trade. Stations of this type are usually managed by a factory expert, who un-

Good Equipment Essential.
Each class of work calls for certain more or less special appliances. A few small miscellaneous tools also will be required and are used in various ways throughout the work. The equipment for battery repair work need not be expensive, but should be of good grade and re-

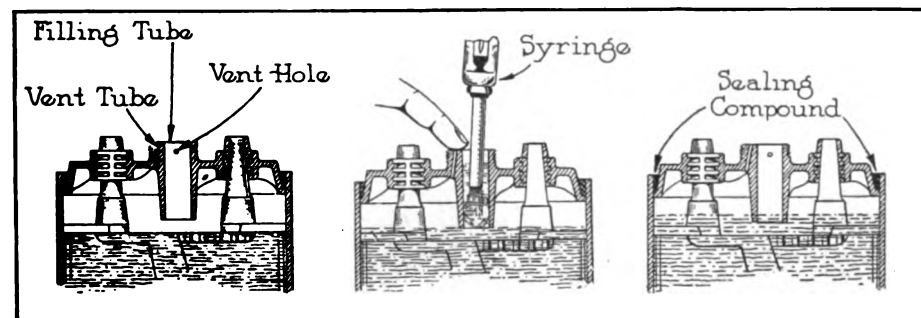
battery case. Side cutting pliers are probably the best for cutting wires and trimming some of the small lead parts.

The terminal nuts are often removed with the combination pliers and these nuts are frequently damaged while removing. It is a better policy to provide a set of S wrenches which will fit all the nuts and which will make the removal easily and without damage. Certainly it is a more workmanlike method to follow.

The sealing compound is removed from around the cell tops when opening the battery; and this compound is trimmed when sealing by a putty knife, a six-inch screwdriver and a $\frac{1}{2}$ -inch wood chisel with the point slightly dulled. These three items are necessities and several of each will prove handy.

The workman should be provided with a large size acid-proof apron and may also use sleeve protectors of similar material to good advantage.

In case one man is employed in handling the elements and other parts wet with electrolyte he will require rubber gloves, or at least rubber finger cots for two or three fingers of each hand. Without such protection the skin will soon become so tender that good work will be difficult. It is also advisable to cover aprons, gloves and shoes with oil or paraffine wax as a preservative against the acid. Gloves will last much longer



Method of Filling Battery and Proper Level of Solution After Being Filled. Note Finger Covers Vent Tube, Preventing Excess Filling.

derstands battery construction and operation from a practical as well as a theoretical standpoint, and motorists who patronize stations of this type usually have no complaint to make of the service received.

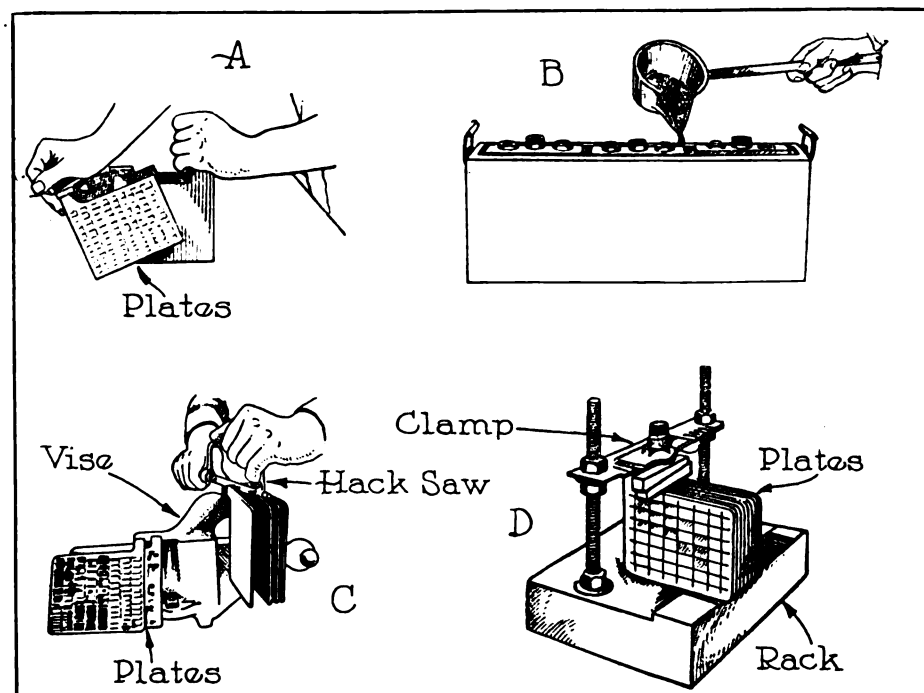
CUSTOMERS are urged to have the battery of the car tested at regular intervals, at these times having the terminals cleaned and tested for tightness and distilled water added if necessary. In this manner a careful check is kept by the station of each battery and the owner has the satisfaction of knowing that the factory making the battery is interested in his receiving the utmost service from it, and that it will function properly unless some other unit of the car goes wrong.

The ability to make satisfactory, workmanlike, economical repairs is the test of the efficient battery repairer. This ability can only be gained through doing careful and painstaking work according to accepted methods. In deciding on what repairs are necessary much depends upon the judgment and experience of the repairer, who should always balance the probable cost of the work against the length of service that may be expected from the battery in the future.

Good tools and equipment should be provided as they are necessary if high grade service is to be given. Service stations would not think of attempting mechanical repairs without proper facilities, and it is just as necessary that the battery service station be equipped with the essentials for this class of work.

liable make, as cheap tools and equipment are often made of soft metals that will not work satisfactorily.

Four kinds of pliers should be provided. Two pair, or more, of six-inch combination pliers can be used for handling terminal fastenings, connectors and many small parts. Long handled gas pliers will be found very handy for removing connectors, terminals and other elements from the jars. Flat nosed pliers, two pair, are used in pulling jars from the



A—Separating Elements. B—Pouring Sealing Compound. C—Cutting Out Plates. D—Plates in Rack Ready to Be Worked on by Repairman.

if rubbed in dry washing soda, after acid moistened parts have been handled.

Opening the Battery.

The first step in repairing is to open the battery and remove the elements for inspection. This work may be divided into three parts for purposes of explanation. First, the terminals and connectors should be disassembled; second, the cell covers loosened by heating the compound with a flame or with a steaming outfit, and third, the elements pulled out of their jars, or the jars removed from the case.

The first part of the work, removing the terminals and connectors, should be done as follows:

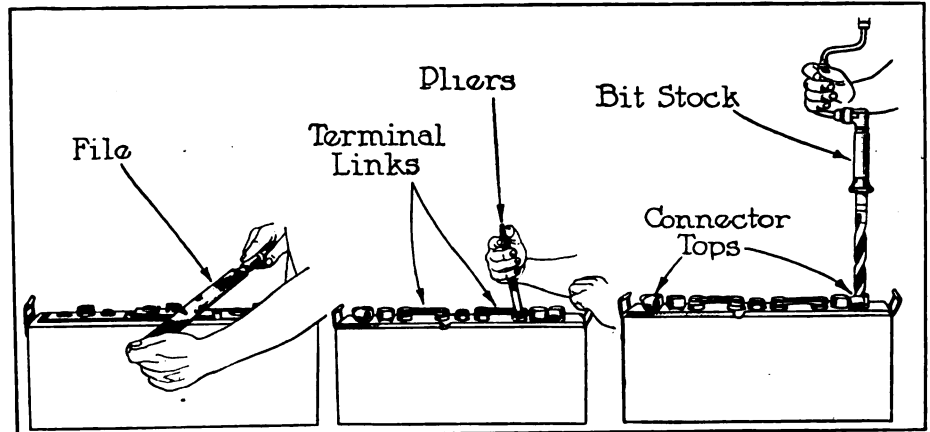
First, when the battery comes in, test the specific gravity and voltage of each cell, and also the discharge performance if convenient, and make a record of the results.

Second, make a sketch of the position of each of the terminals and also the position of the connectors, as this will simplify matters when reassembling.

Third, make a light center punch mark in the center of each terminal post, both for posts carrying the outside terminals and for those carrying the cell connectors.

Fourth, drill down into the lead of the terminal post, using the center punch mark as a guide. Drill deep enough so that the connectors and terminals are freed from the post, that is, so that the burned on taper joint is drilled away. Do not drill deeper than necessary to loosen the parts, as this will only make it necessary to do more building up when attaching these parts at the completion of the work. The drill used should be $\frac{5}{8}$ inch for $\frac{3}{4}$ inch posts, $\frac{3}{8}$ inch for one-inch posts, care being taken that the hole made is not too large. The drill may be used with a hand brace, a post drill, a portable electric drill, or a regular power driven drill press, depending upon the facilities of the shop.

Connectors and terminals can also be removed by melting the top of each terminal post in the center of the connector ends or in the center of the terminals, by using the lead burning torch. While the lead is still molten the terminal or



Left, Using File to Break Connections. Right, Drilling Connector Tops. Center, Lifting Off Terminal Links by Use of Straight-Nosed Pliers.

connector is pried up from the top of the post and removed from the battery.

Fifth, remove the connectors and terminals by inserting the point of a screw driver under them, resting the screw driver shank on a metal strip laid along

the terminal posts. If the terminals and connectors do not come away readily the drilling or melting was not sufficiently deep and it should be made deeper.

Sixth, brush all of the lead trimmings from the top of the battery and wash away any collections of dirt or grease so that the entire top is clean.

Seventh, attach the terminals and connectors to the battery by tying them to the handles with lengths of wire. These parts are to remain thus until the battery is assembled again.

Eighth, remove the vent plugs and blow out the accumulated gas.

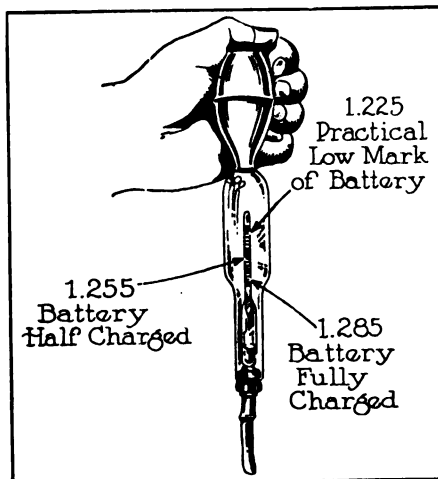
Opening Battery with Torch Flame.

If by chance the shop is not equipped with a battery steamer for steaming and softening the sealing compound, this work may be done with the flame of a gas and air torch or, in emergencies, from any form of torch using gas or gasoline, although care should be used that a workmanlike job may result.

If the battery is of the single cover type the torch flame is played around the edges of the cells until the compound commences to soften. The flame should be kept moving at all times and it will be found better to use less heat and a slightly longer time in this work so that there will be no danger of burning the covers.

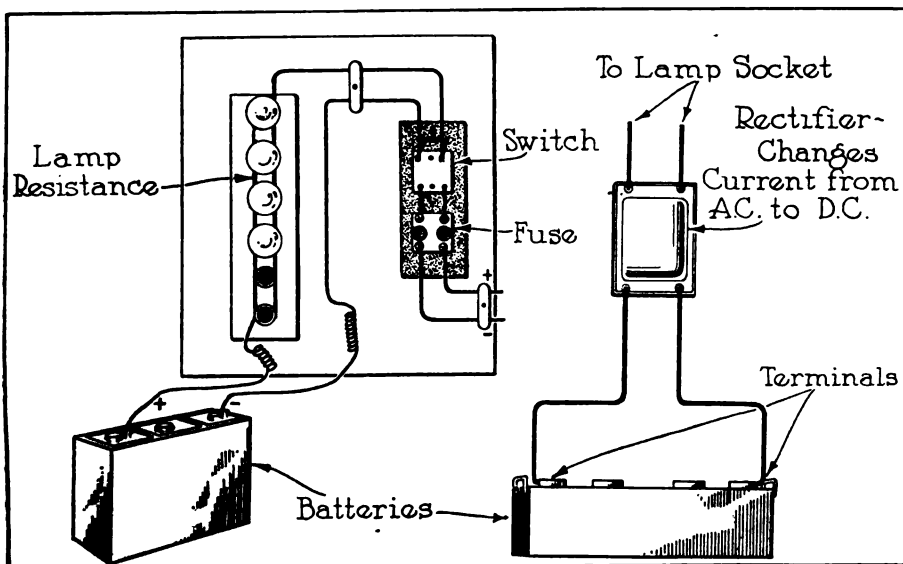
After softening with heat the compound can be dug out of the recesses with the screw driver or the wood chisel, heating either instrument for the work to facilitate removal, although the heat should not be sufficient to draw the temper. Heat again may be applied should difficulty be encountered, and the process continued until all of the compound is freed. A hot putty knife should then be run around the outside edge of the cover, between the cover and the jar, entirely freeing the cover. The cover as a rule is not removed from the element at this time, but is allowed to remain over the terminal posts while the element is being removed from the jar.

If the battery is of the double cover type, having a layer of sealing compound between the two covers, the compound is removed from around the edges as described above. The flame is then played over the surface of the top cover so that the underlying compound is softened and this cover is removed by working the screw driver or putty knife under the



Showing Battery Filling and Testing Syringe with Graduations of Interest.

the battery edge, then carefully prying up. These parts can also be removed by grasping them with the combination pliers or the gas pliers and pulling upward while gently moving them back and forth. Do not use enough force to bend



Left, Charging Battery by Using Lamp Bank Resistance. Right, Showing Use of Rectifier in the Circuit, Changing Current from A. C. to D. C.

edge of the cover and gently prying upward until the cover comes free. These covers should not be forced off, but sufficient heat should be used, to free them from the compound without straining.

After the top cover is removed, much of the warmed sealing compound from underneath may be dug out with a screw driver or putty knife, applying heat as needed to hasten the removal. The warm putty knife is then run all around the edges of the bottom cover and jar until this cover is free. With some types of battery cell construction the lower cover may now be lifted off while with other types it remains to be removed with the element.

Opening Battery with Steamer.

The necessary work of freeing the cell covers may be done more easily and quickly by softening the compound with live steam. Two general types of steamers are in use, the type most commonly employed is in the form of a small steam

cover battery 15 minutes steaming will be required. No particular steam pressure is necessary because upon escaping into the atmosphere the heat of high steam pressure would be quickly lost. If a gauge is attached to the steamer it should not read more than two or three pounds.

Many home made steamers are in use, these being made from any handy container that will hold water and a very moderate pressure of steam. Six outlet tubes, each fitted with individual shut-off cock, are usually fitted so that batteries of either six or 12-volt types may be handled, or so that two six-volt batteries may be steamed at one time. The tubes may be attached directly to the body of the steamer or may be fitted to a header pipe which is attached to the steamer body.

Usually when a steamer is used it is not necessary to dig any of the compound away with a screw driver or chisel, although the removal of the element and

ment should be rested on the jar with one corner extending down into the jar so that the surplus electrolyte may drain. While the elements are draining the cell covers may be removed.

The covers should be scraped free from any remaining compound by using the warm putty knife. The covers are then washed, and if warped at all, they may be placed in boiling water to soften them. With the covers softened they may be pressed into shape and, if they are flat, can be allowed to remain under a flat weight until again needed.

If no repairs are needed to plates or insulators, the elements should at once be placed in pure water or in a weak electrolyte while other repairs are being made. Exposure of the plates to the air for any length of time will result in hardening and over-sulphation of the negatives and in buckling of the positives. It will be found that exposed elements will soon become extremely hot and that they will often begin to steam as the remaining electrolyte is dried away by the excessive heat generated in the negatives.

With the elements drained, they should be laid on a clean spot on the bench and in such a position that the bottom edges of the plates may be inspected for buckling, breakage and for short-circuits between adjacent plates where the insulators have been worn away or cracked. This inspection should be very carefully made.

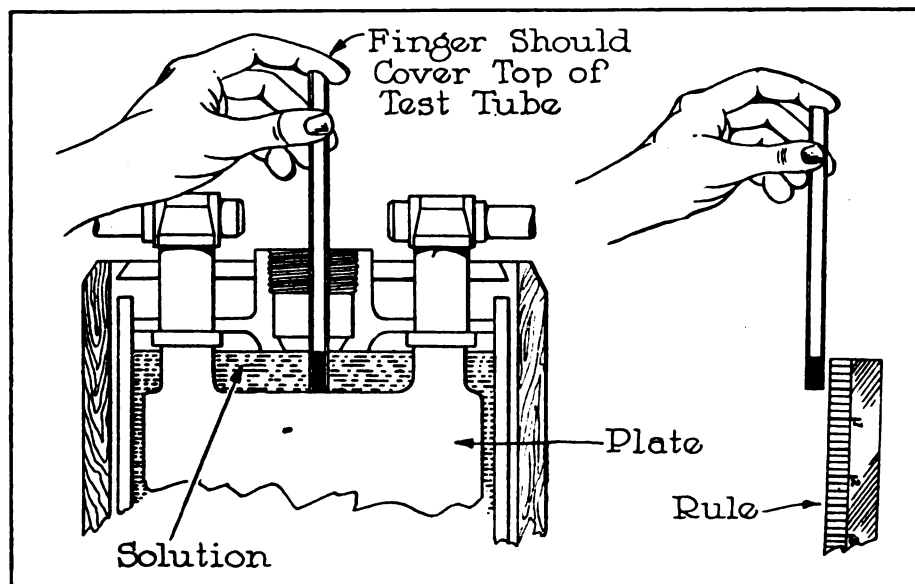
Removing Sediment from Battery Cells.

When the elements have been removed the remaining electrolyte is poured from the jars preparatory to cleaning the sediment from the jars. Often the electrolyte is poured into settling jars where, after the solid particles have dropped to the bottom, the clear liquid is drawn off the top to be used again. As a matter of fact this method should never be followed. It is better practise by far to discard the old liquid and use a fresh supply when reassembling the battery.

The case with its jars is placed on its side over the drain boards of a sink while a stream of water of good force is turned into the jars, one at a time, until all traces of sediment are removed. Sometimes it may be found that the sediment does not yield to the water alone and it will be necessary to scrape it away with a stick or putty knife. With all of the sediment removed the jars are easily examined for cracks and breaks.

The muddy deposit washed from the jars is composed of lead and lead compounds and therefore has a commercial value when sold for the recovery of the metal. The sink should be arranged in such a manner that the heavier portions of metal are retained in the bottom, and only the liquid has a chance to flow out of the overflow pipe at the top. A drain plug is placed in the bottom for use when it is desired to empty the tank and sell the lead and lead compounds.

Should it be desired to open a battery for the sole purpose of removing the sediment, a full charge should first be given and the elements then removed and placed in distilled water while the jars are cleaned. The elements are



Method to Ascertain Level of Solution, Finger Keeping Tube Tightly Covered in Lifting to Prevent Liquid from Running Out of Vial.

boiler having a number of outlets for live steam to which are connected lengths of rubber tubing. The free end of each tube is placed through the filler opening of each cell of the battery and the steam allowed to enter the cell until all of the compound has become softened.

Another type of steamer is in the form of an oven into which the entire battery is placed. Steam is admitted to the oven and this heat continued until the compound is softened. Such heating of the entire battery is of somewhat doubtful benefit to the jars and their fastenings and it is probably for this reason that the type first described is more generally used. Time is a factor which enters largely into battery repairing and the steamer has proved a more expeditious manner of opening.

A small metal washer is fitted around the end of the tube where it enters the cell so that most of the steam is retained where it will do the most good. In the case of a single cover battery steam is admitted for five or six minutes (by the check, not by guess.), while for a double

cover may often be made easier if part of the compound is taken out in this manner. If the steaming is prolonged the condensed water should be removed down to the plate tops at intervals by drawing it off with a syringe.

Removing the Elements from the Jar.

The element, composed of plates, straps, terminal posts and insulators is generally pulled from the jar with the cell cover still in place around the posts. Should the element resist removal, the battery can be held down by using a clamp similar to those used by carpenters and joiners, or by a special clamp attached to the floor. If no clamp is available the battery may be held by the repairer's foot placed on the edge of the case, but outside the edge of the cover.

After the compound has been softened with the steamer or removed by using the flame, the flame is played around the edge of the jar for a moment, the two terminal posts are grasped with the pliers, and the complete element and cover is lifted from the jar. The ele-

again replaced, covered with electrolyte of 1.275 specific gravity and the battery again charged.

Repairing Battery Plates.

If work is required on the battery plates it is necessary to remove the cell covers so that the groups may be separated. Various methods are used for fastening terminal posts through the covers, many of these being apparent from an examination of different types of batteries in any battery service station. In certain types it will only be necessary to unscrew one or more packing units and remove the gaskets. In other types the posts are fastened with sealing rings that have been driven or forced into place. Such rings may be removed by tapping them with a small hammer on one side so that they are ex-

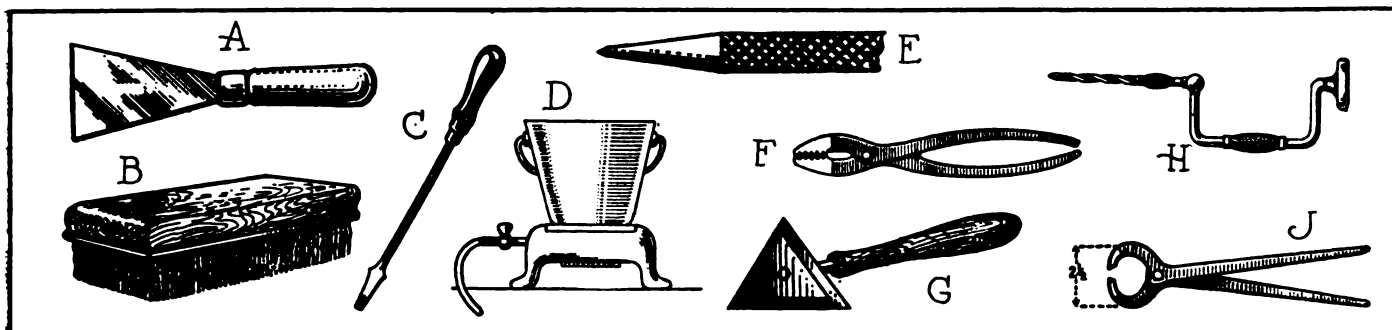
making up batteries for rental purposes. If the negatives are to be used with new positives in the repaired battery, they should be placed immediately in distilled water or weak electrolyte, to remain until ready for reassembling. The surface of the positive plates may be cleaned with a smooth piece of wood, but it will not be necessary to keep the positives in water or to wash them before they are reassembled.

Should the active material in the negative plates be bulged between the grid bars, the plates may be put into shape for further use by forcing the material back into place with a plate press. One should bear in mind, however, that this material will not regain its original characteristics of durability, porosity or conductivity and will have a tendency to

as is used in a carpenter's bench vise. An old letter press also works satisfactorily. Many stations use an ordinary steel vise, having four or five-inch jaws, and obtain good results. The press should be mounted so that the water and electrolyte forced from the plates may drain away into the sewer or into the wash sink.

Should the plates be only slightly warped, they may be reassembled with new insulators and pressed just enough to allow them to go into the jar easily. If the plates are badly buckled, however, it is best to straighten the groups separately before they are assembled with insulators between the plates.

It may be necessary to place boards of proper thickness between adjoining plates of a group. If buckling is excessive, it probably will be necessary to



Tools and Appliances Used in Battery Repairing and Overhauling, Which Will Be Found in Any Up-to-Date Repair Shop.

panded or they may be forced or cut from the posts. Many manufacturers fasten the posts through the cover openings with sealing compound which has to be warmed with a torch and then dug away to free the parts.

The insulators may be removed from between the plates by slightly spreading the plates apart and pulling the insulators with the help of a flat bladed knife. The usual way, however, is to grasp the terminal posts of the two groups and work them back and forth as the two groups are pulled apart. The insulators will then fall out onto the bench. Wood insulators should be discarded, while insulators of rubber and materials other than wood may be washed and saved provided they are unbroken and in good condition. It will then be possible to make a careful examination of the positive and negative plates.

If any of the plates have lost a considerable part of their active material, or if any of the material is found to be in poor condition, these plates are worthless and should be discarded. If the positive plate material, when tried with a knife blade, is found fairly hard, and if little material has been shed, these plates can be used again. If the negatives are found firm, but not extremely hard, they can also be used again.

The negative plates often are in better condition than the positives. Old negatives may sometimes be saved from a battery that is otherwise worthless. Such negatives should be charged and straightened in the plate press if found warped or buckled. They may then be kept in water or may be stored dry until wanted. This kind of material often is used in

shed from the plate at the first opportunity.

Using new positives with old negatives is a fairly common practise and under most conditions, when the negatives are in good condition, this practise is to be recommended.

It is seldom, if ever, advisable to use new negative plates with old positives because of the naturally shorter life of the positives. It may sometimes happen that only one or two plates of a group have been damaged and these would, of course, be renewed and the new plates used with the remaining old plates.

Using the Plate Press.

Buckled negative plates may be straightened and used again provided they are in otherwise good condition. That is, if there has been no great loss of material, if the material remains firm and if the grids have not cracked, the buckling alone may be corrected. Buckled plates should first be fully charged so that the hardened sulphate is removed and so that the active material is soft and rather pliable. This will also avoid much of the danger of cracking the grids in the press and will prevent loosening of the material which would be followed by excessive shedding when the battery is again placed in use.

If the plates are in good condition for pressing when they are removed from the battery, this work should be done before they are allowed to dry. In any case the groups to be pressed should be thoroughly wet with water before placing them in the press.

Specially designed presses are made for this class of work, but a home made press can be made which will do satisfactory work, by using a long screw such

start with boards that are quite thin in order to avoid cracking the plates at the lugs through bending them apart. After part of the operation is performed, the thin boards can be replaced with others that are just as thick as the distance from one plate to the next one. Heavier boards are placed over each end of the group to be handled.

The assembly of boards and group of plates is placed in the press or vise and pressure is applied gradually, avoiding unnecessary strains. The pressure is continued until the plates of that group have become straight or very nearly straight, after which they may be assembled with the opposite group in the usual manner.

Fitting New Insulators.

The battery repairer should never reassemble the element with the old wood separators that came out of the battery element, because they are sure to have deteriorated to some extent regardless of their age. The cost of new separators is too small to count in comparison with the results gained. Rubber insulators of the various types generally are used again provided they are undamaged and have been washed in running water for at least 15 minutes.

After a wood insulator has been once moistened, it should never be allowed to dry out until finally discarded. If insulators are purchased dry they should be immediately placed in a weak acid solution several days before being used in assemblies and should remain in this solution until used. If purchased in a moistened condition they should be put into the acid solution as soon as unpacked and should remain there until required. This is imperative.

One portion of the work bench should be set aside for use in handling insulators or that part of the bench used for this work should be thoroughly cleaned of all particles of metal as they tend to stick to the insulators entering the cells where they will form short circuits.

Insulators may be purchased of the correct size for the plates with which they are to be used, or a few standard sizes may be kept on hand and these may be trimmed to the correct dimensions as required for each repair job. The trimming is done with a special cutter or by one of the larger sized photograph trimmers. After the size is determined stops are placed on the bed of the trimmer and the insulators cut while held against these stops. The trimmer should be operated with a quick, full stroke.

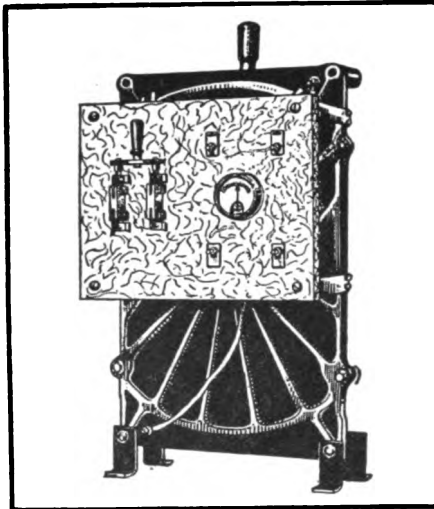
Insulators should be wide enough to project slightly beyond the edges of the plates at each side, their total width being determined by the inside dimension of the jar. Insulators should extend above the plate tops until they strike the hold-downs when these devices are used, or should extend enough above the plates so that their upper edge is slightly above the highest point of the plates when no hold-downs are used. The insulators should extend flush with the plate bottoms, or preferably a little way below the bottoms when first put in place. Insulators that do not meet these requirements will allow short circuiting from one plate to the next.

Should any type of hold-downs be used for aligning the parts of the elements, they should be inserted after the groups are placed in proper relation to each other, but before the insulators are in place.

When ready to insert the insulators the element is laid on its side so that the lower edge is supported a little distance above the bench top. The first insulators are put into the center of the element and the work is carried out to opposite ends. With wood insulators their ribbed side is placed toward the positive plate surface. Failure to observe this precaution will allow the active material from the negative plates to bulge and stick to the insulator ribs.

If rubber insulators are used in connection with the wood pieces, the rubber sheets are placed between the positive plate surface and the wood insulator, with the ribbed side of the wood toward the rubber. After the insulator is started in place it may be driven home with a flat piece of wood and after all of the insulators are in place the element may be carefully jounced down on the bench top to make the lower edges of the insulators come even with each other. The element with the insulators is then washed and if found slightly too large for the jar it is squeezed in the plate press.

If one or more jars are found upon examination to be cracked or broken, they must be removed and replaced with new. In some batteries the jars are held with clamps and bolts, but in a majority the jars are held in place with sealing compound.



Type of Resistance Rheostat Very Frequently Used in Battery Charging.

A damaged jar is made ready for removal by filling it with boiling water, which is allowed to stand for at least five minutes, or else by using a battery steamer and allowing the heat to continue for five minutes while a tube is inserted in the jar with the jar top closed with a loose cover.

After the sealing compound has been softened by the heat, two opposite edges of the jar are grasped with flat nose pliers or tongs and the jar pulled from the case with a steady upward pull out of the case. The interior of the case should be examined and any excess compound or other obstructions removed. A very small quantity of sealing compound may then be poured into the bottom of the case should it be found that additional height will be required to bring the top of the jar flush with others. In most cases nothing should be put underneath the jar.

Jars used for replacement purposes should be of good, fresh stock. Old rubber jars lose their flexibility and are then broken very easily. A jar in good condition should allow some movement of the walls, even when cold.

When the battery jar is ready for placing in the case it should be warmed by filling with hot water for a few minutes or by playing the torch flame around the interior. The jar can then be pressed down into place. The work will be easier and will be better done if a wood form is placed inside the new jar and pressure applied on the wood. The jar must be pressed well down into place until its upper edges are flush with the upper edges of the other jars of the battery. If the jars are a loose fit in the case, the additional space is filled by inserting spacers of thin paraffined wood between the jars or at either end.

It will be advisable to leave the cell connectors off until the cell with the new jar has been charged, because it may be found that this cell will call for more charging than needed by others in the battery.

The foregoing instructions can be used for reboxing a battery or replacing the old case with a new one. Sometimes the entire cell, with the elements in place,

will simply be removed from the old battery and put into the new case, but usually the elements will be removed for one reason or another.

The Cell Assembly.

After the necessary repairs have been made and the insulators put in place, the element should go into the jar without delay and should be covered with electrolyte of the correct gravity ready for charging. The elements should not be allowed to stand around and become dry, the maximum allowable time before replacing in the jar being from one hour to an hour and one-half.

Elements are inserted in their jars by first slightly warming the jar with a torch flame, then grasping the element so that it can be pinched together at the bottom and sliding it down into place so that the plate bottoms seat squarely on the sediment bridges. The element should make a snug fit in the jar because if it is loose the sediment bridges will wear through the plate edges and the bridges also will be quickly worn away. A snug fit can be secured by putting an additional insulator at one end of the element.

A repaired battery should be charged and tested before the cell covers are replaced and before the terminals and connectors are burned on. At the end of the charge the gravity is equalized in all of the cells and a discharge test should be given. If the behavior of all the cells is satisfactory in voltage, temperature, specific gravity and general ability, and if all of the terminals are found placed correctly as to polarity, the battery is then recharged and finally assembled with the cell covers and connectors. It is not safe to finish a repaired battery without a trial charge and discharge of this kind.

Sealing the Battery.

The sealing compound is melted in an iron kettle or old tea pot over a gas stove. With the kettle a large ladle is used, this ladle having a generous sized spout or else having a special valve opening through the bottom through which the compound can run.

The cells are made ready for sealing by putting the covers in place. If they are a snug fit they can be relieved by running a putty knife around their edges. If the covers are loose around the edges the space should be filled with hemp twine or tow so that the melted compound cannot run through into the acid space of the cell. All cover parts can be handled without danger of breakage if slightly warmed with the torch flame before they are put in place.

With the covers in place and the post locking devices and packing gaskets properly secured, all of the parts with which the compound comes in contact should be washed with kerosene. It is advisable to close the filler openings with wooden plugs while pouring the compound.

The compound in the melting kettle should be kept hot enough to flow evenly and to fill all spaces before setting, still it should not be hot enough to emit any quantity of smoke. The melted compound is poured slowly into all spaces to be filled, taking care that no air holes

are formed during the work. Best result will be obtained by moving the stream constantly around the space being filled so that the filling comes up evenly at all points. Because of the fact that compound shrinks considerably while cooling, an excess should always be used as this is easily trimmed away to make a good appearance.

If the battery is of the double cover type it is best to warm the top cover and to heat the top surface of the compound before this cover is put in place. After the top cover is placed it should be held down with a wood form having holes drilled for the terminal posts. This form is weighted with about 100 pounds and allowed to remain in place for 15 minutes, or until the compound has cooled.

Excess compound is removed with a hot putty knife or with a knife wet with kerosene. The battery is then washed with kerosene and thoroughly dried. The work can be tested by tilting the battery one way and another after the electrolyte is in the cells, when any leakage can be noticed, as the liquid comes around the edges of the covers and around the openings through which the posts pass. The battery is then painted with acid-proof asphaltum paint.

Lead Burning the Connectors.

Lead burning is the name given to the process of melting the lead and lead alloy parts of the batteries so that they flow together and make good electrical and mechanical joints. Lead burning is accomplished by the use of a flame produced by various gases, by the heat of electrical resistance of a carbon point, and by the use of hot soldering coppers in emergencies.

The type of equipment most generally used consists of a tank of compressed oxygen to which is fitted a regulating valve for reducing the gas pressure to the correct amount for use with the torch, also a safety valve attached to the illuminating gas pipe, a specially designed torch for producing the burning flame and the necessary tubing connections.

The safety valve is required in order that there may be no chance for the high pressure oxygen to back up into the illuminating gas mains, where the combination of the gases would produce a very explosive mixture.

The burning torch is usually equipped with two valves, one controlling the oxygen and the other the illuminating gas, and these valves are manipulated by the operator until the flame has the desired characteristics.

Another popular type of equipment consists of a mixture of hydrogen gas and compressed air. The outfit includes a generator for making the hydrogen, but this gas may be bought in compressed form in steel tanks or bottles, which proves much the best method of using it where the tanks can be obtained. The hydrogen generator comprises an elevated tank carrying the sulphuric acid and a lower tank in which is placed granulated zinc. The action of the acid with the zinc causes hydrogen to be generated and this gas is taken through a wash bottle to a tee connection, where it

is allowed to mix with the compressed air.

The tank usually has a capacity of from 20 to 40 gallons and is fitted with a hand or power operated compressor pump. From this tank a line of tubing leads to the mixing tee. The tee is fitted with two valves, one for hydrogen and the other for air. The torch consists of a handle and a burning tip.

Other gas outfits include those using a mixture of oxygen and acetylene controlled in practically the same manner as for oxy-acetylene welding, but with a special torch, also devices using mixtures of oxygen and hydrogen and others using illuminating gas and compressed air. The two equipments first described are those generally adopted because either one or the other may be easily secured and they are more satisfactory for this work than the remaining types.

When employing the electrical burning equipment for regular work in a battery station the electric outfit uses current from the lighting or power lines. If these lines carry alternating current, the burning equipment includes a transformer, which reduces the voltage and makes a heavier amperage available. If the supply is direct current, some method of reducing the voltage is employed, this usually taking the form of a rheostat.

One end of the burning circuit is attached to the body of the part being handled by means of a heavy clip through which current flows to the point of operation. The other end of the burning circuit consists of a handle carrying a rod or pencil of carbon, one end of which is brought to a fairly sharp point.

The circuit is completed and the heat produced by bringing the carbon point in contact with the part of the lead to be melted. The carbon immediately becomes white hot and the metal softens. The carbon is moved about and manipulated to flow the lead to the desired shape by always keeping the carbon barely in contact with the metal. The carbon should not be held far enough

from the lead to draw an arc while working. The degree of heat may be adjusted within narrow limits by increasing or decreasing the depth to which the carbon is dipped in the molten metal.

Electric burning can also be done by using the current from the battery being repaired or by using current from another storage battery. In this case it is only necessary to bring leads from the other battery or from the terminals of the battery being repaired. One lead is connected directly to the part being burned, while the other ends in a handle carrying the carbon pencil.

Unless the work cannot possibly be done with the gas flame or electric methods, a soldering iron should not be employed, because the joint cannot be so well made, nor can the appearance be made as good as with the former methods. If it is necessary to use the iron it should be heated red hot and all tinning thus burned away. No flux is to be used, but the iron can be applied directly to the points to be melted.

The preparation and handling of battery parts for this work calls for the employment of a few special tools, as follows:

Seven or eight-inch end-cutting nippers for trimming posts, lugs, connectors, etc.

Diagonal cutting pliers.

Triangular scraper for cleaning and finishing posts, connectors and other lead parts.

Stiff wire brush for cleaning parts before and after burning.

File brush or file card for cleaning files and also for cleaning lead parts.

Coarse 10-inch round file for use in connector holes.

Eight or 10-inch hack saw frame and blades for cutting plate lugs.

Wood mallet for driving parts into place.

Ball peen hammer for general utility.

Smoked or blue glasses for use of operator while burning.

For handling terminals and connectors, it will be necessary to have building forms or nipples having a tapered hole into which lead is melted to raise the post height. It is also advisable to provide tapered reamers for enlarging the openings in terminals and connectors. A post reducer can be conveniently used for trimming excess metal from terminal posts so that the parts will fit into place properly.

In burning plates into their straps to form groups or in making repairs, it will be necessary to supply a suitable rack with a set of spacers that will allow for the different distances between the plates of various batteries. A special hand punch may be secured which will punch out the holes in the plate straps when part of the old lug remains in place after the plate is broken or sawed off.

Battery repairers will generally find that after the parts being joined have been fused, additional metal will be required to finish the work and to give a good appearance. This additional metal is secured from small bars made from pure lead, if used on connectors and ter-

(Continued on Page 164.)

OKLAHOMA CITY SHOW.

THE Sixth Annual Oklahoma City Automobile Show, which will be held in the new \$300,000 Coliseum, begins on March 27 and extends through to April 1, as the show management feels that this is the most auspicious time to stage the event. Automobile concessions will rent for \$100 for the week of the show, and accessory booths will be \$75. E. T. Bell is secretary of the Oklahoma City Motor Car Dealers' Association, under whose direction the show will be held.

TRUCK TALK

CONCERNING CREDIT.

"TAKE the cash and let credit go—" More and more the repairman of moderate means is doing just that. And he is prospering, although at the very start of what may be a radical business change, he is apt to encounter certain opposition that may decrease his business for a few weeks—unless he gets out and hustles for more customers. Especially in the small towns, there is a hostile sentiment to overcome from those persons whose forbears for generations have been used to paying the local tradesmen "when the harvest was in."

The writer is well acquainted with a country merchant who retired from a retail business after 28 years with more than \$14,000 on his books. Less than one-fourth of this amount was collected—the rest was "marked off the ledger." This man's oldest son, mechanically inclined, learned the trade of blacksmith, and graduated into a first class automotive repairman. By religiously saving his money, he required a small automobile repair shop, the owner of which was glad to sell because he couldn't make a living at the business. But the new owner prospered.

The first thing he did after cleaning the shop and putting it in first class order was to have two signs painted which politely informed the public that, under the new management all work and supplies would be handled on a strictly cash basis. It is probable that he lost several former customers of the shop right then, but he stuck to his original intention and soon was doing well.

Certain criticism has been levelled toward him by other repair shop proprietors because he does work at a somewhat lower figure than obtains in the community. He explains the decreased rate, however, by saying that he can afford it as he gets every dollar due him and, in addition to this, takes all his discounts, which puts him further ahead than those who charge higher prices and fail to collect their bills. And this probably is true.

Obviously, the big business of today must be done on credit. Whether it could be done under any other system as certain reformers so fondly preach is a question that must be settled by someone more conversant with the subject than this writer. Our present method of finance undoubtedly is the best that can be devised to suit current conditions, although there appear to be

certain attractive features in the somewhat vague plan recently outlined by a prominent automotive manufacturer.

The small repair shop operator will find little fault with the cash plan of doing business, once he has made the change, and, if his experience is anything like the majority who have tried it—will wonder why he ever worried along with a "set of books."

CONSTRUCTIVE SALESMANSHIP.

"CONSTRUCTIVE SALESMANSHIP," more than ever is needed in merchandising motor trucks. This, admittedly, is true and the clever, thoughtful salesman who has made a success of the business knows why, whereas the "drifter," who has given little attention to the business, and has sold only enough machines to make a living, in all probability, knows not the meaning of the phrase.

Of what does Constructive Salesmanship consist? How is it defined? As applied to the merchandising of motor trucks, it means simply the studying out of specific reasons why the prospect can economically use a truck in his business—and **knowing his exact needs before calling on him.** As an example, let us suppose the salesman plans to sell a machine to the proprietor of a lumber yard. In an abstract way he knows that the lumber dealer can use the truck to good advantage, because other lumber dealers are doing it. But that isn't enough to know under the present conditions. The salesman who really desires to succeed will find out **just why the lumber dealer can use the truck to advantage.**

He may talk with the employees of the yard and find that the dealer has a large amount of small orders for daily delivery to nearby customers. These orders may total 12 or 1500 pounds and it is possible that a large part of the total amount of the dealer's business consists of these small orders.

Under the existing conditions it may be that the dealer is sending out these orders in a large truck, whereas, it would be advantageous, from the standpoint of economy, to use a light truck which also could be worked on long distance hauls where a heavy truck was not needed.

Having ascertained the facts in the case, the salesman rehearses then carefully and calls on the

dealer, confident that he can at least gain attention, simply because he has something to talk about in which the dealer of necessity must be interested. The rest just follows on.

The foregoing is a skeletonized example of the meaning of the phrase, "Constructive Salesmanship,"—the real salesman will supply his own details.

PRIDE OF CRAFT.

"PRIDE OF CRAFT," unfortunately, is a 'phrase in an unknown tongue' to many a workman in this day and generation. The present idea seems to be for the boy learning the business to bluff his way along from one job to another until such time as he has, to an extent, mastered the bare rudiments of his trade, and then to "set up" as a journeyman.

In the old days, a man worked his four years' apprenticeship, got an actual drilled-in knowledge of the finer points, and had to know every phase of the business before he was accepted as one of the crew. He was proud of his calling, made others respect his skill and scorned leaving his work unless it was "finished in a workmanlike manner, according to specifications."

Those old teachers were thorough. They were fussy, too, and the youngster under their tutelage simply had to learn or pass on to some other trade to which he was more fitted. It wasn't enough that the lad learning carpentry know how to saw a board—he must know just how to hold the saw to get the best results. Furthermore, he also must know how to file that saw so that it would cut from heel to toe.

The young man learning the machinist trade had to know his micrometer and how to handle it. He had to understand how to put the proper edge on his tools and how to make those tools from the bar steel. No wonder those men were proud of their ability. They had something of which to be proud. They were "master workmen" and, as such, entitled to all the respect that is vouchsafed the master.

A majority of the young automotive mechanics of today, if ocular evidence is to be believed, do not possess this pride of craft." The training period has been too short for one thing and they have not learned their trade. The main trouble, however, seems to lie in the fact that they have no pride of accomplishment and no respect for the engineering genius that has created the truly marvelous mechanism of the modern automobile.

And if you don't believe this is so step into a back garage and look around a bit. Watch one

of these "mechanics" bang a wheel off with a sledge instead of using a puller, then see him take a hardened steel hammer and drive out a highly-finished shaft, perhaps upsetting the end, when he should have used a lead or copper maul. A chisel and hammer removes a refractory nut quite as well as a wrench, if one may judge his actions—and dirty, greasy overalls on the fine upholstery of an automobile mean little to him. Certainly and fortunately these statements do not apply to all automotive repairmen, the majority of whom are as skilled as any craftsmen in this country. It is unfortunate that this highly specialized industry should number even a few "ingenious bunglers" in its ranks.

"EACH TO HIS OWN—"

THIS writer knows an elderly salesman who has sold trucks nearly fifteen years. During that time he has handled only three different makes of vehicles and has done unusually well with each. He has more than the average amount of intelligence, is well educated and, because of his fine reputation, could easily have found the necessary capital to establish an agency at any time during the last ten years. But he still sells trucks for someone else.

An acquaintance—one who knows him well—once asked why he didn't go into the distributing end of the business.

"You've sold for others long enough—why not let others sell for you?" asked the friend.

"But I don't want to go into the business," said the salesman. "I want to sell. It's what I enjoy."

"Yes," persisted the friend, "that's all right—true enough—but there's more money in running the business for yourself."

"I understand that," said the salesman patiently, "but I don't care for the business end of it, I like to sell."

"Yes, Yes" expostulated the friend. "I get your idea—you like to sell because you can sell—but you'd make more money—"

"O, Yes"—interrupted the salesman, "I understand you—but I'm not interested in making money—I'm interested in selling trucks. Your statement, that I like to sell because I can sell is wrong. I can sell because I like to sell. The money end of the matter is incidental."

But the friend couldn't fathom the depths of such philosophy. He had no patience with it. "The old fellow is the best salesman in the state", he said, when telling of the incident, "but, I admit, I can't, for the life of me, see why."

International Motor Truck Corporation Earnings Curtailed

Profits Are \$126,921 for 1921 Against Nearly \$3,000,000 for 1920—President Brosseau Expresses Optimism for Coming Year's Business.

NEW YORK, March 14.—The International Corporation, for the year 1921 reports net earnings of \$126,921 after all taxes, interest and inventory adjustment. This is equal to \$1.16 a share on the first preferred stock. In 1920 the company showed net profits of \$2,644,013. The detailed income account follows:

	1921	1920
Sales	\$24,849,268	\$34,071,365
Expenses, etc.....	24,247,131	29,915,499
Net earnings.....	\$602,137	\$4,155,866
Other income.....	293,427	432,285
Total income.....	\$895,564	\$4,588,151
Inventory adj.....	331,357	1,419,138
Interest		
Federal taxes, etc....		525,000
Net profits.....	126,931	2,644,013
Preferred divs.....	1,136,617	1,515,232
Deficit	\$1,009,686	*\$1,128,781

The balance sheet on Dec. 31 shows profit and loss surplus of \$9,258,700, against \$10,323,422 at the close of 1920. Accounts receivable were \$5,639,901, against \$3,472,348. Inventory was valued at \$9,675,583, against \$15,588,848.

A. J. Brosseau, president, in his remarks to stockholders, said that "orders on hand and prospects for business justify the belief that the sale of Mack trucks during the coming year will be at a greater rate than in 1921."

OWNERS TO FIGHT INCREASE.

NEW YORK, March 15.—New legislation of chief importance to the trade in New York State is chiefly confined to the raising in price of truck registration fees.

Rates on motor commercial vehicles have been increased, but through the representations made to Senator Lowman and others by officials of the Motor Truck Association of America, the legislators admitted that the fees first proposed were excessive, and substantial reductions were made. Notwithstand-

ing this, the new motor truck fee for all vehicles will be 60 per cent. higher than at present, a very material increase.

The new system imposes a fee of \$8 per gross ton, making \$16 the minimum for two tons or less. The fee for such commercial vehicles is now \$10. The average five-ton truck, which, when fully loaded, has a gross capacity of about 11 tons, will pay a fee of \$88, instead of \$55, as at present. These new motor truck fees will also go into effect on the first of next year.

GRAMM MOTOR TRUCK FUEL ECONOMIZER.

A new device has just been placed upon Gramm trucks manufactured by the Gramm Bernstein Motor Truck Company, known as the "Gramm fuel economizer," which will be interesting to all truck owners, inasmuch as it is claimed to effect a real saving in fuel consumption upon this make of truck.

The device is placed between the carburetor and the intake manifold and serves to pre-heat the gasoline vapor. The heat from the exhaust gasses is utilized for this purpose and by a peculiar arrangement in the inside wall of this economizer, very surprising results have been obtained, states the manufacturer. One of these outfits was recently tested out upon a Model 30, three-ton Gramm truck by Willard J. Gramm, chief engineer of the company.

A one-gallon tank was hung on the side of the truck and attached by a gasoline line with the carburetor. This was filled with gasoline and the truck was run until the gasoline was used up. The first trip was made without the economizer, having the carburetor bolted directly to the intake manifold,

while the second trip, which was made in the same direction and under exactly the same weather conditions, with the economizer in use.

It was found that the truck ran seven miles without the economizer and 7.45 miles with the economizer, giving 6.4 per cent. increase in mileage to the gallon. The truck was loaded to capacity when tested and was a new one.

The company expects even better results than this upon a truck which has been in service for some time

HIGH COST OF GASOLINE LEADS TO SUBSTITUTE.

PARIS, FRANCE, March 10.—The rapid increase in the use of automobiles, motor trucks and motor-propelled agricultural machinery, together with the high cost of gasoline in France, has brought about much study of the possible use of other motive fuels, which might be manufactured from native materials at lower cost to the consumer than gasoline.

At the annual meeting of the agricultural society at Bezier a committee was authorized to organize a competition with a view of discovering a practical and economical motor fuel with alcohol as the basis of its composition. Prizes totaling 200,000 francs have been placed at the disposition of the committee, of which amount 100,000 francs will be awarded to the competitor whose product gives the best results. The competition will be open from January to March, 1922.

While the motor fuel sought for is intended for consumption in the existing type of motor engines, a product which could be employed in a modified type of engine will be considered.

ASSOCIATION HOLDS ELECTION.

CHICAGO, March 12.—The Chicago Automobile Trade Association has elected the following officers: President, Thomas J. Hay; vice president, Dayton Keith; secretary, James Levy; treasurer, W. J. Boone.

New England Road Commissioners Decide on Uniform Markers

Official Meeting Called and Action Taken That Promises Effective Remedy of Confusion Caused by Present Conflicting Methods of Marking.

BOSTON, MASS., MARCH 10.—At a conference in Boston a few days ago, official action was taken that promises to put an end to the confusion that prevails in the conflicting systems of highway marks now in use. Highway commissioners of all the New England states met and decided on a new plan of uniform markers, according to a simple system that is capable of extension throughout the country.

The subject was first brought up at a meeting of the New England Hotel Men's Association and Arthur L. Race, president, suggested that there must be some method of marking the highways that could be used throughout the United States, much simpler than any employed at present. The road commissioners of New England, accordingly, were asked to attend the meeting, which was held in Commissioner Cole's office at the Highway Department in the State House, Boston, on Tuesday, February 28.

Mr. Wells of the Automobile Club had been asked to submit a new plan of road marking that would embody the result of his fifteen years' experience in all parts of the country. This plan, being laid before the conference of highway officials, had received the inspection approval of the club officers, and, after the two days' meeting, was unanimously adopted by the entire body.

ELECTRIC VEHICLES TO HAVE SHOWING.

NEW YORK, March 12.—Electric vehicle dealers are planning to make April one of the most auspicious months in the history of the industry. A two weeks' exhibit of their offerings—products of growing importance in the field of transportation—and a series of confer-

ences are on the programme.

The show is scheduled for April 3 to 15, and more than 30 manufacturers have signified their intention of taking part. It will be held in the big show room of the New York Edison Company, at Irving place and 15th street. Admission will be free. During the first week trucks ranging from 750 pounds capacity up to five tons will be shown. Passenger cars also will be displayed during the first week. On April 9 the "big fellows" will give away to the electric industrial trucks and the second week will be devoted to the demonstration of methods of handling materials at freight stations and in industrial plants.

An accessory exhibit will extend over both weeks.

A luncheon of the electric vehicle trade will be held at the Hotel Astor on Tuesday, April 4. Water front congestion and its remedy, inefficient methods of handling materials in factories and operation of street trucks will be discussed at the conferences, one of which will take place during the first week of the show and another the last week.

WARD LAFRANCE REDUCES ALL PRICES.

ELMIRA, N. Y., March 14.—Prices on Ward LaFrance chassis have been reduced as follows: Model 2B 2½-3½-ton chassis from \$3590 to \$2990; Model 4A 3½-5-ton chassis from \$4690 to \$3990; model 5A 5-7-ton chassis from \$5590 to \$4590.

TRAFFIC BUREAU TO AID FARMERS.

The Bureau of Traffic and Transportation which recently was established by the State Department of Farms and Markets, is said to be doing particularly good

work. "While the organization traffic manager, cannot, in every way, take the place of the man employed in this capacity by individual firms," commissioner B. A. Pyrke said, "there are many instances where a co-operation between the two offices brings quicker and more satisfactory results; while in the case of the small shipper who has not the volume of business to justify, and who cannot afford to employ exclusively the services of such a man, the organization traffic manager offers him a way to handle his traffic and transportation problems indispensable to the proper conduct of his business.

GOOD ROADS WILL SOLVE FARM PROBLEMS.

WASHINGTON, D. C., March 12.—The Joint Commission of Agriculture Inquiry sees in good roads one of the ways of solving farm difficulties. Part one of the report on "Agricultural Crisis and Its Causes" says: "Good roads to local markets, joint facilities at terminals connecting rail, water and motor transport systems and more adequate facilities at shipping points will materially contribute to the reduction of costs of marketing and distribution to the mutual benefit of producer and consumer.

TRUCKS ROLL UP BIG SCORE ON HORSES.

CHICAGO, March 12.—Records of horse-drawn vehicles and automobiles licensed in Chicago for the years of 1914 and 1921 present a striking object lesson of remarkable increase in motor use and the gradual elimination of the horse for city transportation purposes. In 1914 Chicago issued licenses for 51,942 horse drawn vehicles and 32,360 for motor cars. In 1921 only 26,535 horse vehicles were licensed, while motor cars increased to 168,221. In these figures motorcycles are not included.

Of the motor vehicles, 29,239 were trucks and busses, 18,429 being of one-ton capacity or less and 10,810 exceeding the one ton.

Substantial Price Cut Announced by Duplex Truck Company

Four-Wheel Drive Reduced \$750. "Limited" Remains at Original Figure but Recent Mechanical Changes Have Enhanced Value Says the Manufacturer.

LANSING, MARCH 14.—The Duplex Truck Company announce a sensational reduction of \$750.00 in the list selling price of the Duplex four-wheel drive truck. The manufacturers state that the price of this truck was advanced but very slightly in the four years of expanding costs, and say that the radical cut is out of proportion to the actual savings accomplished through reduced costs and inventory shrinkage.

The Duplex Limited Truck sells at its past figure, but, it is claimed, that \$500.00 in value has been added to this truck by the mechanical changes that have been made, and it being increased in size to two tons capacity.

All the prominent features that have made this model well known in the 1½-ton field have been retained and added to, and, at the same time the various units of its construction have been improved, enlarged and strengthened to synchronize with the increased rating.

The Duplex Special Bus remains the same price as announced last Fall. The selling price of this model was based on the present day market costs, and the figure is so low that a revision upward would be warranted, it is said.

H. M. Lee, president of the Duplex Truck Company, states that all signs point to a reviving truck market during the present year. Interest in the motor bus is steadily increasing, which is logical because of the many advantages possessed by such a vehicle as a passenger transportation unit.

MOTOR TRANSPORT IN GREAT BRITAIN.

LONDON, ENGLAND, March 14.—Railway companies in Great Britain are being offered serious

competition by motor highway transport, which is making great headway and is viewed with considerable alarm by railway officials, according to reports received by the automotive division of the Department of Commerce. High railway rates, an excellent system of highways, and the release of large numbers of motor vehicles formerly used for military purpose, together with the men who drove them, all combined with a winter climate not unduly severe, serve to advance this competition. However, in some quarters its importance is thought to be overestimated, because motor traffic will ultimately be compelled to bear its proportion of taxes for maintenance of the highways; furthermore, doubts exist as to whether any of the motor transport companies are setting aside the proper sums for repair and renewal of vehicles.

The number of road transport undertakings in operation in 1921 was 3000, with a capital of \$885,000,000, exclusive of business men who use their own fleets of motor trucks. A recent press estimate of merchandise hauled by road transport in the United Kingdom in 1921 was 6,000,000 tons.

TRAFFIC ORDER SAVES MAIN HIGHWAYS.

CONCORD, N. H., March 12.—Reports received today at the office of the state commissioner of highways from points in the southern counties indicated that the commissioner's order, in effect this morning, limiting trucks on the state highways in that section to a three-ton load, came just in time to save the roads from much damage. No reports of willful disobedience to the order were received. Commissioner Everett feels sure many

thousands of dollars will be saved by the order.

Additions to the list of posted roads will bar trucks of more than three-ton weight from practically all New Hampshire highways south of a line drawn east and west across the state through this city. As the season progresses similar rulings will be made as to improved roads north of Concord, while at the same time, Commissioner Everett says he will remove the ban from the roads now affected as fast as conditions will permit.

TORBENSEN AXLE COMPANY ESTABLISHING STATIONS.

With the idea of obtaining a national distribution for Torbensen service parts the Torbensen Axle Company is establishing a chain of parts service stations.

In explaining this method of parts distribution R. C. Enos, vice president and general manager of the company, said: "Each main service station will have a complete line of Torbensen axle parts for all models and will be centrally located, so that parts can be sent to any point in its territory with not more than 24 hours delay."

Applications for parts service station representation are now being considered and it is expected to have the entire distributing organization completed within the next 60 days.

EARLE T. SUTTON WITH SIGNAL TRUCK.

DETROIT, MICH., March 14.—M. B. Hoagland, president of the Signal Truck Corporation, has appointed Earle T. Sutton to the factory staff.

Mr. Sutton was formerly advertising manager of the Denby Motor Truck Company, and prior to that appointment had extensive sales experience, both wholesale and retail, with various well known and representative companies.

The appointment carries out the Signal policy of maintaining an organization of men that have proven their fitness through their wide and varied experience.

Motor Truck Club of Massachusetts Holds Yearly Election

Unanimously Names James J. Scully President, H. Arthur Ball Vice President, W. Herbert Griffith Treasurer and Day Baker Secretary.

BOSTON, MARCH 14.—The annual meeting and banquet of the Motor Truck Club of Massachusetts was held at the City Club, Boston. The following officers were installed in office for the year:—

President, James J. Scully, president the Scully Co., Cambridge; Vice President, H. Arthur Hall, C. E. Hall & Sons, Somerville; Treasurer, W. Herbert Griffith, treasurer Independent Trucking Corporation, Boston.

Directors, Cornelius F. Bowen, Boston; L. L. Borden, proprietor, Textile Trucking Company, Fall River; Norman Halliday, manager, Mack Motor Company, Cambridge; H. F. Reinhardt, Mills Transfer Company, Boston; John S. Lovering, proprietor, J. S. Lovering, Boston.

Dwight W. Sleeper, who has been secretary of the club since its formation, resigned and Day Baker was elected secretary.

Mr. Baker, who is treasurer and chairman of the legislative committee of the Boston Commercial Motor Vehicle Association, chairman of the legislative committee of the Massachusetts Automobile Dealer and Garage Association, and Massachusetts sub-chairman for the Motor Vehicle Conference committee, addressed the club on the handling of legislative matters. Mr. Baker has had wide experience in the handling of matters before legislative bodies as for years he has been chairman of the legislative committee of the vehicle bureau of the National Electric Light Association, and the associations which preceded this bureau.

The proposed increases in motor truck registration fees was discussed at some length. Mr. Baker was authorized to represent the club before the Massachusetts legislative committees and municipal bodies.

Mr. Oscar F. Ostby of the Prest-O-Lite Company of New York spoke on various state regulations covering the use of headlights on trucks. He informed the members of the club that acetylene gas lamps had now been finally approved as standard equipment for trucks under the Massachusetts laws.

Messrs. J.-J. Scully, H. B. Church and Cornelius Bowen spoke on the application of various laws to truck drivers and users, and the secretary was requested to endeavor to have restrictions removed from the use of certain signalling devices.

The members were all urged to attend the hearing on motor vehicle fees before the Ways and Means committee of the Massachusetts legislature, in the large auditorium at the State House, Boston, on March 6th and 7th, commencing at 10:30 in the morning. Unless the truck users fight and fight vigorously, they fear they will have their fees increased from 100 to 300 per cent. The slogan has gone out to all truck users: "Fight or Pay."

"SAFETY FIRST" LESSONS ATTRACT DRIVERS.

BOSTON, MASS., March 13.—Twenty-four fleets of trucks operating in Greater Boston are represented by their chauffeurs at the free course of instruction that the Massachusetts Safety Council is holding on Tuesday nights in the hall of the Boston Young Men's Christian Union, at No. 48 Boylston street.

On a recent evening Oscar F. Ostby of New York spoke on "The Care of Your Truck Headlight," and Alfred W. Devine, state headlight inspector, on "The New Headlight Law."

Drivers of automobiles as well as trucks were admitted to this meeting, at which James J. Scully of the

Motor Truck Club of Massachusetts presided.

It is pointed out that other states might well adopt a similar course.

NASH MAKES RADICAL CONTRACT CHANGE.

KENOSHA, WIS., March 14.—The Nash Motors Company has announced a new truck policy of merchandising Nash trucks, new prices and a line of new truck models. Hereafter contracts with Nash truck dealers will be made direct by the factory and not through Nash wholesale distributors as heretofore. A feature of this new truck contract is the discount given to dealers. This and many other clauses in the contract make it exceptionally attractive from the dealer's standpoint.

Those who have given this new Nash truck contract close scrutiny and compare its possibilities for profit with the usual form of dealer agreement, say that it offers unusual opportunities for a permanent and profitable business. Every indication points to the fact that the truck business in New England is making rapid gains in practically every community and that those dealers who are equipped to take full advantage of this condition with the right line of trucks, backed by a strong factory, will be amply rewarded for their efforts.

In commenting upon the new truck policy, C. B. Voorhis, vice president and director of sales of the Nash Motors Company, has this to say: "During the past five years it has been the policy of the Nash Motors Company to market both passenger cars and trucks through Nash distributors, but our experience has demonstrated conclusively that the passenger car business and the truck business are entirely separate and distinct. Therefore, while it will continue to be the policy of the Nash Motors Company to handle passenger cars through distributors in identically the same way we have done in the past, we have decided that it is wise and necessary to segregate our truck business entirely from the passenger car business."

Denby Motor Truck Company Has Meeting—Retains Management

Board of Directors Chosen Includes E. R. Ailes, Hon. Edwin Denby, J. Walter Drake, C. H. L. Flinterman, H. L. Lyster, A. S. More and T. M. Simpson.

DETROIT, MARCH 14.—The annual meeting of the Denby Motor Truck Company was held at the company's plant February 15th. The same management was continued in office and the following directors were elected: E. R. Ailes, treasurer, Detroit Steel Prod. Company, Detroit; Hon. Edwin Denby, Washington, D. C.; J. Walter Drake, chairman, Hupp Motor Car Corporation, Detroit; C. H. L. Flinterman, V. P. Detroit Pressed Steel Company, Detroit; H. L. Lyster, attorney, Detroit; A. S. More, president, Denby Motor Truck Company, Detroit; T. M. Simpson, asst. secretary, Continental Motors Corporation, Detroit.

Even though 1921 was an extremely dull year in the truck industry, the Denby Company is now in a better financial position than a year ago with all inventories charged down to current replacement values. A decided improvement in truck buying is indicated for 1922, in fact the Denby Company has received as many truck orders for the first six weeks of this year as came in during the first three months of 1921. The demand is especially good on the $\frac{3}{4}$ ton and on the 1- $\frac{1}{2}$ ton trucks. A new model 35, 2- $\frac{1}{2}$ to 3-ton truck, with all the latest improvements has recently been added to the Denby line and sales on this new model are already very promising.

SEEK "BRAND" FOR WILD AUTO DRIVERS.

NEW YORK, March 15.—Recognizing the need for some sobriquet that will fit the reckless motor car driver, the American Automobile Association has started a campaign to find such a term. The plan of the A. A. A. is to brand that reckless motorist with a name that

will be as comprehensive and become as popular as term "jay-walker," which is now applied to the careless pedestrian.

For the right name the association offers a prize of \$25 in cash. The hunt is to be conducted in contest form and all persons having what they consider a suitable appellation are invited to submit their choice to the national headquarters of the A. A. A. at Washington.

MOTOR VEHICLES IN THE BAHAMA ISLANDS.

There are 191 motor vehicles in the Bahama Islands, of which 49 only are trucks of American manufacture. The annual addition is about 12 trucks, and apparently no

effort can substantially increase these figures. Of the total population of 56,000, some 40,000 live in isolated islands, almost roadless, where there is neither money to buy nor roads to carry self-propelled vehicles.

The island of New Providence, with a coast road of less than 50 miles, contains the only town of importance in the archipelago—Nassau, with a population of 15,000. The duty on trucks, and spare parts is 10 percent ad valorem. There is an annual registration fee of about \$5.00 (American values) for commercial trucks. The yearly fee for a license to drive a truck is the same. There is no duty on catalogues or on printed advertising matter and packing should be as for a transatlantic or transcontinental shipment.

AMERICAN EXPRESS ADDS TO ELECTRIC FLEET.

NEW YORK, March 12.—With the purchase recently of 104 electric trucks, the American Railway Express Company has still further strengthened its claim as the largest user of electrics in the world. The company now has in service throughout the United States more than twelve hundred electrics—this in addition to its gasoline trucks and horse drawn wagons. The new equipment is for service in New York, Philadelphia and Buffalo. The New York allotment comprises twenty trucks of the five-ton size; Philadelphia is to have fifty two-ton trucks while the thirty-four for Buffalo are of the two and three-ton sizes.

It is planned to use the New York trucks on a twenty-four hour basis. This will be accomplished by means of standardized, interchangeable batteries, each truck being provided with two storage batteries. Thus at the end of the first shift the exhausted battery will be removed and a freshly charged one put in its place. The battery boxes are designed for rapid changing and special devices for battery handling have been installed at the charging stations.

THINGS TO DO.

1. Oil the springs.
2. Tighten the fan belt.
3. Adjust the carburetor.
4. Examine cylinders for carbon.
5. Take an inventory of the tool box and accessories.
6. See that every moving part is well oiled and greased.
7. Check up the tires and see that they are in proper condition.
8. Flush out the radiator and clean the cooling system thoroughly.
9. Drain the crankcase, transmission and differential and wash out with kerosene. Put in new oil and grease.
10. Clean every working part of the car, particularly the parts underneath, which many motorists forget ever exist.

Thousands More Vehicles Needed for Pupils in Rural Districts

THOUSANDS of automobiles are needed by rural schools to-day to replace horse-drawn equipment, to renew worn out motor transport units, and to serve additional schools routes. Twelve thousand consolidated (rural union) schools are now in operation in the United States, according to the U. S. Bureau of Education; and the same authority reports that fully half the vehicles used for carrying pupils are motor driven. A consolidated school is one which combines several districts. This means that some of the children must be brought from a considerable distance. In Massachusetts half of the children for hom transportation is furnished are carried on electric and steam roads, the remainder by motor vehicle or horse-drawn conveyances. If the Massachusetts percentage holds true for the country as a whole, there are approximately 18,000 automobiles and as many wagons or carriages used in school transportation. This assumes that the 12,000 consolidated schools have a conservative average of 150 to 180 pupils carried per school.

Most of the 18,000 or more horse-drawn carriers can be profitably replaced by motor vehicles, except in certain sections where bad roads are a barrier to automobile use.

Massachusetts Recommends Motor Vehicles

"The motor bus is fast replacing the horse-drawn vehicle because of its superiority in regularity, speed, and general comfort," says Bulletin

No. 115, Massachusetts Dept. of Education.

"On the whole — transportation by motor bus is found to be somewhat less expensive than by horse-drawn vehicles," says the same authority, giving figures.

Rapidly Expanding Market Probable

Much more of the business of supplying motor transportation to schools, however, will be available in the case of new consolidations. There are 194,000 one-room schools in the United States. Most of these eventually will be centralized, and at each center there will be need for a half-dozen or more passenger

partial list, compiled from latest available data, gives an idea of the extent of the movement:

State	Number of Consol Schools
Indiana	1002
Ohio	913
North Dakota	526
Iowa	380
Massachusetts	333
Minnesota	302
West Virginia	171
Missouri	150
Kansas	140
South Dakota	140
Colorado	114
Kentucky	80
Nebraska	61

Local Dealers Can Aid Movement

Local dealers can help both their communities and their own busi-

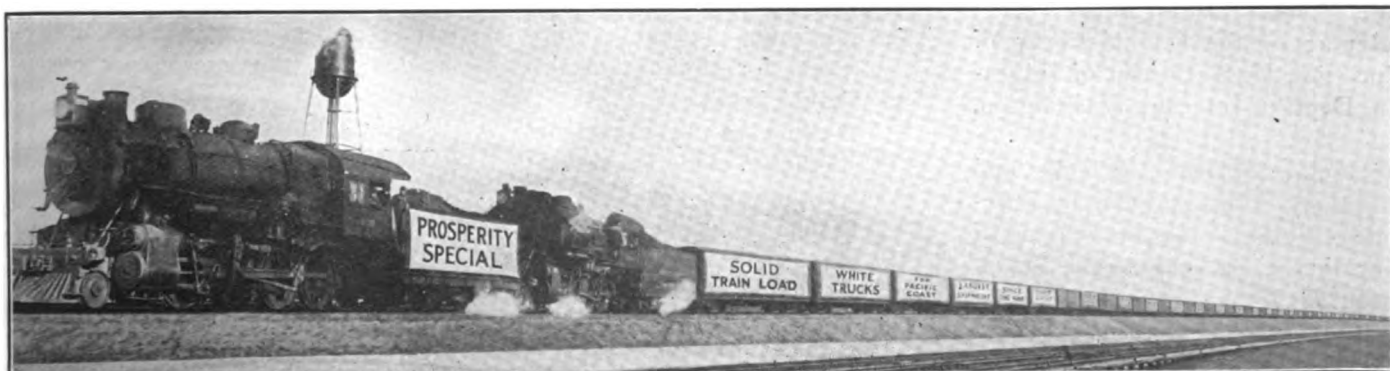
SELLING POINTS ON SCHOOL TRANSPORT.

1. Twelve thousand consolidated rural schools in the United States are using vehicles for transporting pupils.
2. About half of the equipment is motorized and half horse-drawn.
3. "The motor bus is fast replacing the horse-drawn vehicle because of its superiority in regularity, speed, and general comfort." —Bulletin No. 115, Massachusetts Dept. of Education.
4. One hundred and ninety four thousand one room schools not yet consolidated promise great future motor vehicle market.
5. Two hundred and seventy-five new consolidations are under consideration in Pennsylvania.
6. U. S. Bureau of Education suggests automobile bus body improvements—see details below.

cars or motor buses. The movement toward consolidation is rapidly growing, though deterred by good roads in some sections.

Pennsylvania is considering 275 new consolidations at the present time. Iowa put in a new consolidated school for each day of the school year in 1920. The following

nesses by standing for the consolidated school movement in the rural districts of their territory. The United States Bureau of Education and other leading educational authorities recommend consolidated schools which means better buildings, better paid teachers, and consequent better instruction for the



This "Prosperity Special" Loaded with White Trucks Appears to Have Been Well Named.

children than the one-room schools can afford. Dealers can secure full information concerning this movement in their territory by writing to their State Board of Education, or consulting with their local school authorities.

Claxton Says Autos Aid Learning.

The relation of good roads and the automobile to education is briefly and forcibly stated by U. S. Commissioner of Education P. P. Claxton as follows:

"If there were more good roads and more auto buses in our rural counties, the consolidation of schools could go on apace with a reduction of 50 to 80 per cent in the number of school houses. One-third of the one-room teachers could be dismissed without overburdening the better prepared and better paid consolidated school teacher."

Official Suggestions on School Bus Needs

Salesmen who approach school committees on the subject of buying motor transportation will find their task aided by having some special knowledge of the subject. J. C. Muerman, of the U. S. Bureau of Education, Washington, has prepared the accompanying suggestions on body styles and service instructions. These suggestions are based on hundred of inquiries and recommendations from schools all over the country:

More Detailed Information Available

Further information on transportation for consolidated schools may be found in the following bulletins:

Consolidation of Schools, Bulletin No. 115, Dept. of Education, Commonwealth of Massachusetts, State House, Boston, Mass.

Report of the Commissioner of Education, U. S. Bureau of Education, Dept. of Interior, Washington, D. C.

Consolidated Rural Schools and the Motor Truck (issued by Firestone), Bulletin No. 6, Bureau of Education, Dept. of Interior, Washington, D. C.

Rural School Messenger, Mar. 1920 issue, 514 E. Normal Ave., Kirksville, Missouri.

Economic Factors in Farm Motorization

(By C. F. CLARKSON, General Manager S. A. E.)

THE effectiveness of the work of the Society of Automotive Engineers results from the professional solidarity of a large number of highly trained sincere men. The S. A. E. personnel, including practically all of the leading

automotive designers and producers of the country, as well as many executives and other men with whom they work, is keen and earnest. Its single purpose is to serve.

THE country is in the midst of acute troubles due to unprecedented postwar maladjustment and to lack of judgment in expanding production facilities unduly during the period of return to peacetime industrial strife.

We must think rightly before we can act rightly. It has been observed that it is far easier to confuse human reason than the laws of gravity. The problems before us are bigger than any one man's head. In other words, we must take advantage of joint procedure. It has been enunciated that at the root of our refusal to think things out in advance, to arrange concisely the forces adequate to attain a clearly conceived end, is a sort of half belief and half feeling that it does not pay to think things out. Moreover, thinking is hard work, not to speak of formulating and executing sound plans for carrying out those things which proper study indicates should be carried out. The reign of machinery, the outstanding feature of recent progress has, it is said, annexed our very minds and processes of thinking.

Nothing will bring about a return of balanced trade except the gradual working out of economic laws—which means time. The interdependence of the nations of the world is obvious. The American farmer is becoming internationally-minded, as the newspaper corre-

(Continued on Page 167.)

FORDSON OUTPUT WILL BE DOUBLED.

DETROIT, March 13.—The Ford Motor Co. will increase its tractor production to 400 daily in April, thereby doubling the present output.

SCHOOL BUS BODIES.

1. Top ventilators are desirable.
2. Preferable to have driver's seat in the same compartment as passengers, so that he can keep control of children.
3. As much weight as possible needed on front wheels. Present tendency is for large school buses to have too much weight on rear wheels.
4. Two exits important, in case of fire, capsizing, or stalling in drifts.
5. Where four rows of seats running lengthwise of bus, are provided, ample aisle space should be allowed, using maximum possible width of body.
6. Upholstery—if not too expensive, removable khaki upholstery over leather or leatherette would be preferable to plain leather currently used, as the khaki could be removed and washed.

SERVICE SUGGESTIONS

1. Seller should provide adequate service instructions.
2. Minimum garage equipment for minor repairs should be stated.
3. Definite arrangements should be made for service station work.
4. Statement needed of how long paint should stand up, and what grade of paint is needed for repainting.

Endorses Highways Program

Senate Committee on Postoffices and Post Roads Approves Continued Federal Aid Appropriations for Next Three Years—Immediate Support of Measure Urged.

New York, March 15.—A committee from the highway committee of the National Automobile Chamber of Commerce states that the Senate Committee on Post Offices and Post Roads, of which Senator Charles E. Townsend of Michigan is chairman, has reported out the Post Office appropriation bill with a rider providing for an appropriation of \$50,000,000 for Federal Aid for highway construction in the fiscal year of 1923; \$65,000,000 for 1924; and \$75,000,000 for 1925. The first amount becomes available July 1st of the present year and is essential to the continuation without interruption of the highways building program. The measure also contains appro-

priations for forest roads of \$7,500,000 for each of the fiscal years of 1924 and 1925.

The bill passed the House without a rider and accordingly if accepted by the Senate must be referred back to the House for approval.

The sums mentioned represent the absolute minimum requirements for the highway program. To lower them would be to decrease efficiency and to lower the standards of road construction in the United States. Speaking without prejudice Mr. Thomas H. MacDonald, chief of the Bureau of Public Roads, recently stated that if the people of the United States desire to see a completed system of seven per cent of the highways of the country

within the next decade, in his judgment Federal Aid appropriations would have to be continued at the rate of \$100,000,000 a year. The program will take fifteen years at the rate of \$75,000,000 a year, plus state and county contributions and twenty years at the rate of \$50,000,000 annually. It is evident that losses in transportation costs due to poor highways would far exceed the cost of construction, if the longer program is adopted.

If the reader agrees with the highway committee in its advocacy of continued Federal Aid at the maximum rate consistent with efficiency it is urged that he write or wire his representatives in Congress to that effect.

Truck with Trailer Hauls Unusual Load

T. Q. Fleming, manufacturer of long and short leaf, yellow pine and cypress lumber, piling and cross ties at Savannah, Ga., was recently confronted with the problem of moving several pieces of lumber of unusual length.

To a standard wheel base Armleder 2½ ton truck he attached a two wheel trailer, then loaded two pieces of lumber 12 by 12, 52 feet long. This truck performed marvelously in delivering these long

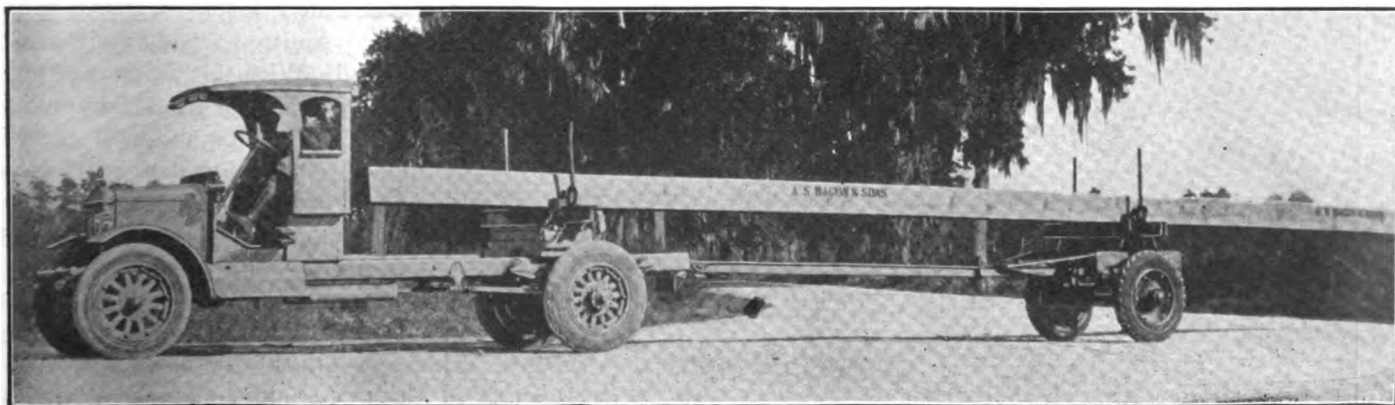
pieces over sandy roads, meeting all road conditions in a manner that was a revelation to Mr. Fleming.

He states that this truck has already travelled over 30,000 miles, has hauled 2,500,000 feet over a 19 mile trip at practically no expense, with the exception of gasoline, oil and tires, and was found to be very economical on these items. Mr. Fleming says his tires average 20,000 miles. He found that his truck and trailer handled this long

material through crowded streets, abrupt turns, over steep inclines and declines, without any trouble whatever.

MAY CHANGE NAME.

NEW YORK, March 10.—The International Motor Truck Company has called a special meeting of its stockholders for March 22 to vote on changing the name of the company to Mack Trucks.



Armleder 2½ Tonner with Load More Than 62 Feet in Length Proves Motor Trucks Adaptability to Unusual Conditions.

U. S. Shows Light Delivery

Newest Offering of Well-Known Manufacturer Is Quality
Product Designed for Economy and Efficiency—
Has Loading Space of 108 Inches.

A NEW model general utility truck is now offered by the United States Motor Truck Co. This truck is claimed by the manufacturer to be the last word in dependability, efficiency and adaptability. The power used by the truck is furnished by a four-cylinder motor cast en bloc, of $20\frac{1}{4}$ horsepower, S. A. E. rating, with a stroke of $5\frac{1}{8}$ inches and a bore of $3\frac{5}{8}$ inches.

THE cylinder head is cast and machined separately and is easily removed from the cylinder block at any time. It is a well known fact that the power of an engine increases as the cube of the speed and this gives to the engine an approximate rating of 30 horsepower when revolving at 1400 revolutions per minute.

The engine is securely fastened to the truck frame at three contact points, this type of fastening being commonly known as the three-point suspension. It is claimed that this method of securing the engine to the frame allows more stress to be exerted upon the frame, without causing misalignment in the engine proper.

A centrifugal pump driven through shaft and gearing is provided to supply cooling water to the

engine and oil is supplied to the bearings and journals by a gear pump completely submerged, which delivers the oil under pressure to the different points requiring lubrication.

The standard engine equipment includes a generator, tire air pump and starting motor, the latter being equipped with the popular Bendix gear drive, which automatically disengages itself from the engine when the engine acquires a speed exceeding that of the screw shaft on the starter. The engine has a piston displacement of 211.6 cubic inches.

Well selected and high grade wood is used in the manufacture of the wheels, which are carefully made in order that they may stand up faithfully against the shocks and abuse to which all motor truck wheels are necessarily subjected. All wheels are equipped with the Firestone patent steel felloe and pneumatic tires, 34 by five inches on both front and rear. The truck has a wheelbase of 138 inches, with a loading space of 108 inches.

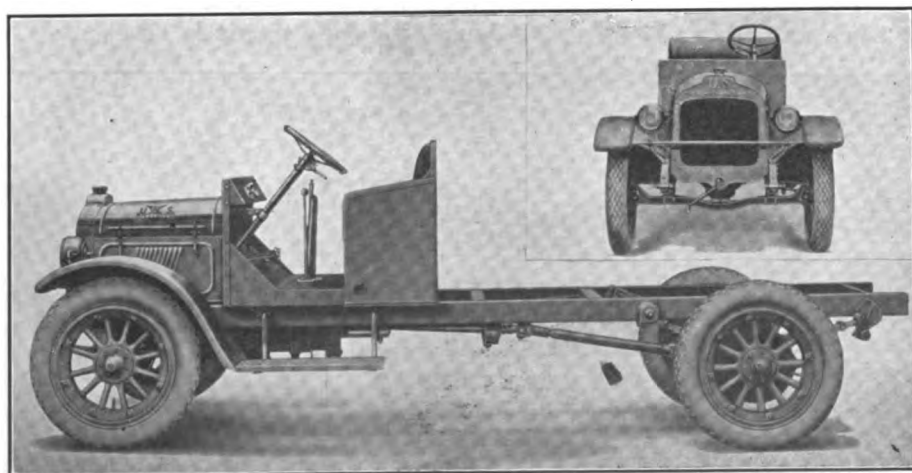
The frame is manufactured of a good grade pressed steel properly reinforced by the installation of cross beams of the same material. These cross beams are securely riveted in place and the manufac-

turer claims a frame of this construction is unsurpassed for its light weight, compactness and great strength. The truck has a length over all of 196 inches, 32 inches width of frame and a total width over all of 70 inches; from the ground to the top of dash measures 56 inches; from the cushion to the ground measures 48 inches and from the ground to the top of frame measures 28 inches.

The driver is allowed a generous amount of space for operating the truck, the distance from the dash to the back of seat measuring 47 inches. The steering post and wheel are located on the left of the chassis, allowing the operator to manipulate the gear shifting lever and emergency brake with the right hand. The seat proper is wide and spacious with a measurement of 44 inches. The other measurements of the vehicle have been carefully calculated, due consideration being given to the proper distribution of the strains and stresses under all conditions met in actual operation. The measurement from the radiator front to the dash is $33\frac{3}{4}$ inches; from the back of the seat to the center of the rear axle, 70 inches; from the end of frame to the back of seat, 108 inches; from the front to back of seat, 20 inches.

Although the manufacturer built this utility truck for light hauling, it is permitted a body weight of 900 pounds. With this amount of weight it is stated the truck has sufficient factor of safety and will carry the load without any danger of damage or harm being done to the machine.

An inclined instrument board is securely mounted on the dash, instruments at all times being plainly visible to the driver without stooping or bending. On this board is the lock switch, ammeter, oil pressure gauge and the speedometer, which



These Views of the U. S. "Utility Truck" Show Finely Balanced Lines.

is driven from the transmission gear.

In this car the manufacturer claims that the very best of materials and workmanship has been incorporated, all stock being well tested and gauged by highly skilled workmen, making it a reliable, dependable and efficient vehicle.

M. W. TORKELSON HEADS ROAD COMMISSION.

MILWAUKEE, WIS., March 14.—Through the formation of a railway department as an active branch of the Wisconsin state highway commission, definite recognition has been given to the necessity of careful planning in the relocation of highways and expert consideration of the question of eliminating grade crossings. In taking this step Wisconsin has again demonstrated its fitness in assuming a leading position as a good roads state. For years the Wisconsin system of roads has been attracting the attention of highway officials from all parts of the country, while the splendid system of highway marking, originated by A. R. Hirst, state highway engineer, is justly famous.

M. W. Torkelson, former bridge engineer for the Wisconsin commission, has been placed at the head of the new railway department. His work will be chiefly connected with relocation of highways and elimination of grade crossings.

FAVORS BUS.

LANSING, MICH., March 12.—Governor Groesbeck has announced that he is not in favor of any legal action tending to hamper development of motor bus and truck interurban traffic. Present indications tend to show that railroads and interurban trolley lines will ask Michigan legislature to put all truck and the bus lines under strict regulations. The question was one of the hardest fought of any before the 1921 session, but no legislation was passed except an act giving the utilities commission control of stock used by interurban motor transport companies.

F. W. D. "Road Builder"

THE Four-Wheel-Drive Auto Company, Clintonville, Wis., has recently developed a truck for road building. The body of the vehicle is stated to be manufactured from a good grade of steel and reinforced by angle plate wherever extra strain or stress is likely to be encountered. The interior of the body is divided into three compartments by movable steel plates, each plate having a separate lever handle. The joints of the body are of the lap type and securely riveted, making the entire body a unit of great strength, capable of standing up rigidly against the heavy duty imposed by heavy loads and the raising and lowering of the body. The capacity of this truck is 6000 pounds. The weight of the body and hoist is 2400 pounds and that of the chassis with pressed on tires is 6175 pounds. The truck has a wheelbase of 105 inches and a speed of 15 miles an hour.

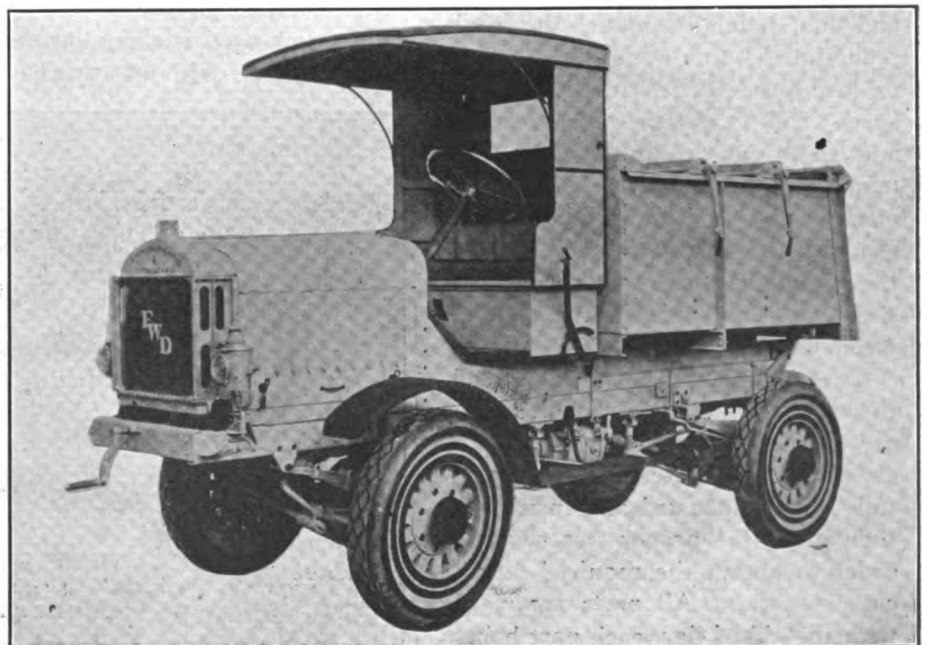
THE manufacturer claims that the four-wheel-drive has a great many advantages for road construction work, as a truck so used is apt to be placed in many positions which frequently require the combined traction efforts of all four wheels. The truck has full floating axles, the front wheels being made steerable by the installation of a ball and socket type joint enclosing the driving universal joint. This joint is water, dust and oil proof. The free working differential and center locking device are used and the entire axle is well reinforced by the use of double torsion rods.

Steering post and wheel are placed on the left hand side of the truck, enabling the operator to work the gear control lever with the right hand. The clearance under the lowest part of the axle is 10 inches,

while that under the transmission is 15 inches. The length over all, including the starting crank, is 181 inches, with a total width over hub caps of 74½ inches. A tank with a capacity of 20 gallons is installed for the gasoline.

Resiliency of the vehicle is amply taken care of by springs being made extra long to assure easy riding and to afford protection to all mechanical parts. The front springs are semi-elliptic and 45½ inches long and those on the sides are 44 inches long. The rear springs are of the well known platform type and are 40 inches long.

The external service foot brake is installed on the driving shaft and has a bearing surface 3½ inches wide, operating on a surface 10 inches in diameter. The external emergency brake has a surface—2¾



F. W. D. Designed to Facilitate Operation in Restricted Area.

inches wide, operating on a surface $15\frac{1}{4}$ inches in diameter.

The motor used to furnish the power to this truck is the Wisconsin, four-cycle, four-cylinder, $4\frac{3}{4}$ -inches bore and $5\frac{1}{2}$ -inch stroke, with a piston displacement of 389.9 cubic inches; S. A. E. rating of 36.1 horsepower and a brake horsepower of 54 horsepower at 1350 revolutions per minute. Cylinders are cast in pairs and are machined with an offset of three-quarters of an inch. The motor is lubricated by the use of both splash and forced systems conveying the oil to the different bearing surfaces.

This engine is fitted with the Stromberg carburetor with the hot air connection applied. Engine speed is limited by the installation of the Pierce motor governor set at 1350 revolutions per minute. The engine furnishes power to the truck wheels through the medium of a multiple disc. The Hele-Shaw clutch having 12 male and 11 female plates and a clutch brake are regular equipment.

The transmission has three speeds forward and one reverse. The sub-transmission is connected with the transmission directly and is cast in one housing, consisting of a silent chain drive, driving the center differential. The silent chain is of the link belt pattern, self adjustable and runs in a bath of oil.

The gear reduction on the third and final reduction makes the total reduction as follows: 35.6 to one on low speed; 17.8 to one on second speed; 36.7 to one on reverse speed and 8.1 to one on high speed. The manufacturer claims the installation of free working differentials and the gradual speed reduction eliminates the possibility of undue strain or shock to any part of the driving mechanism.

Materials and supplies used throughout the entire construction are claimed to be of the very highest quality, all materials being carefully selected, tested and inspected, then given the proper treatment in order to obtain the required physical properties. All parts are made with the aid of jigs, each part being well finished.

G. M. C. Undergoes Severe Test

THE illustration shows a Model K 41 two-ton G. M. C. truck loaded with 7080 pounds placed on the chassis in such a position that 84 per cent. of the load is over the rear axle. This demonstration was designed by A. S. Hitchcock, manager of the Noyes-Buick Company's branch store, at Hartford, Conn.

IT WAS conceived by Mr. Hitchcock while on a visit to the factory, while being driven over plowed fields, through various ditches, over loose railroad ties and similar obstructions in one of these trucks. Mr. Hitchcock has been connected with the G. M. C. Sales Organization for a period of about six years.

The truck has been driven around Hartford and surrounding towns each day, returning to the Noyes-Buick service station, on Connecticut boulevard, where the platform is located, and making the climb of the platform each day at 4 o'clock, where it has been witnessed by large crowds of prospective customers, dealers and competitors, all of whom have expressed their amazement at the wonderful power demonstrated. It has been commented on most favorably as being a decidedly unique demonstration, and one that has not been heard of before.

The truck used is a regular stock two-ton chassis without any change

in either gear ratios or governor settings. The truck is equipped with a speedometer to prove that it is capable of a speed of 20 miles per hour on the road.

The difficult climb is accomplished simply by the new G. M. C. motor, and the two-range G. M. C. transmission. The rear axle gear ratio is $7\frac{3}{4}$ to one. The platform on which the demonstration is made consists of the bottom part on which the truck is run up to the uprights, which represent a grade of 60 degrees for seven feet, and four feet, which is perpendicular, representing a grade of 90 degrees. The front wheels go to the top of these uprights, as shown. Blocks at the top prevent the front wheels from going over, while at the same time the rear end of the frame rests on the ground about 10 inches below the contact of the rear wheels.

At the suggestion of the factory this demonstration is being used at the Boston Automobile Show, and no doubt will be used by several of the other dealers in the Noyes-Buick Company's territory.

HYLAN WANTS BUSSES.

NEW YORK, March 7.—Mayor Hylan has sent a telegram to every member of the Legislature asking them to vote for his bill, empowering the city to spend \$25,000,000 for the purchase of city busses.



It Takes a Real "He" Truck to Stand a Test Like This.

Russel Develops Axle for Steinmetz

THE Russel Motor Axle Company has recently developed a novel double reduction axle for the Steinmetz Electric Motor Car Corporation of Arlington, Baltimore, Md. The latter is producing a three-quarter ton electric vehicle which possesses a variety of interesting features. The axle proper is almost identical with the Russel Model 2400-B of three-

quarter ton capacity, but has special brakes for the peculiar conditions imposed by the use of an electric motor and storage battery. The Steinmetz company and the Russel Motor Axle Company have made careful tests of practically all types of axles during the past three years and the present design is the result of this development.

THE motor is mounted directly to the gear carrier, the spiral bevel pinion causing the first reduction. The countershaft carries the spiral bevel drive gear and the spur pinion. In this new axle the

or bevel gear, which results in an almost perfect unit, it is claimed.

The countershaft assembly is mounted upon a shaft which is inserted in the sleeve during the final assembly. This shaft transmits no

running gear in which it is possible to accurately control the back lash within very close limits.

Inasmuch as the bevel gear thrust is taken by the countershaft bearings, while the wheel thrusts are fully provided for by the wheel bearing mounting, there is no thrust to be taken by the differential bearings. It is unnecessary therefore to provide any means for retaining the differential bearings in the carrier. It is necessary though to provide suitable means for locating the differential with relation to the countershaft spur pinion in order that this pinion will properly mesh with the differential spur gear. This is obtained by inserting a disc between the inner hubs of the differential side gears. This disc has suitable clearance between the side gears and merely acts as a locating plate for the axle shafts. It is only necessary to maintain the distance between the inner end of each axle shaft and the shoulder adjacent to the wheel bearing within nominal limits. The countershaft spur pinion has a wider face than the differential spur gear.

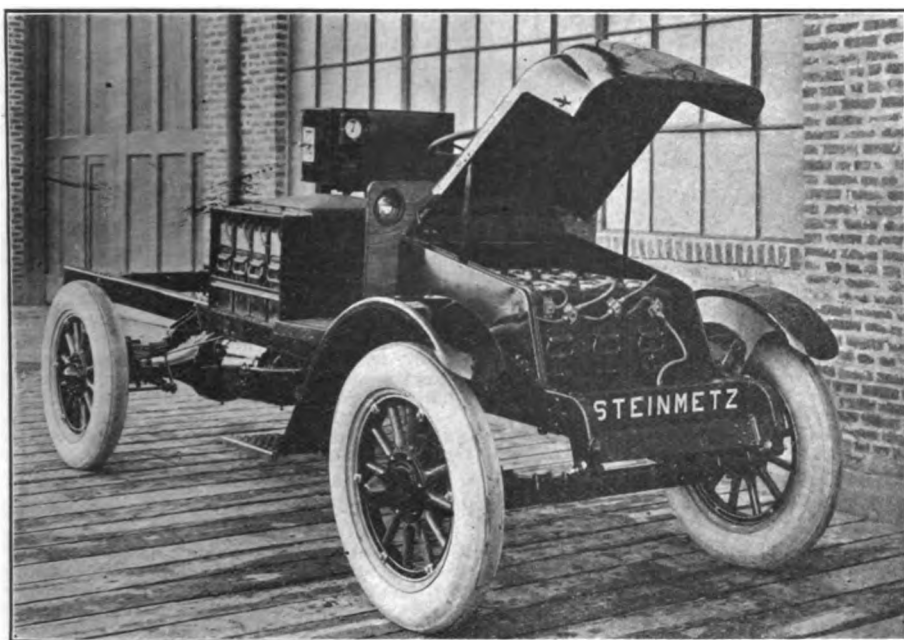


Illustration Shows Location of Motor Closely Adjacent to Differential.

flanged hubs for the bevel gear and the spur pinion are mounted upon a splined sleeve. The bevel gear flange is first bored and faced and then pressed upon the splined sleeve. The spur pinion which has been heat treated and ground is then mounted upon the splined sleeve. The pilot for the bevel gear on the flange is then turned and the inside diameter of the sleeve is ground, both operations being performed in special fixtures that locate the assembly from the pitch line of the spur pinion. The bevel gear is ground on the inside diameter and back from the pitch line. This insures practically no runout of the countershaft assembly from the pitch line of either the spur pinion

torque, but serves to support the countershaft assembly. The differential assembly is rather interesting because of the methods required to insure an efficient and quiet gear set. The spur gear is made from an oil treated alloy steel, and is rough machined all over, including rough cutting the teeth. After heat treatment the gear is centered from the pitch line and the inside diameter and face, to which the differential case flange is attached, are ground. The holes in the web for riveting and the large ones for lightening purposes are then drilled.

The gears are then mounted upon a Fellows gear shaper and the finishing cuts for the teeth are taken. These methods make for a smooth

TRANSPORT RE-ELECTS SAME OFFICERS.

MT. PLEASANT, MICH., March 14.—Transport Truck Company held its annual meeting on February 22. All officers were re-elected: President and general manager, M. A. Holmes; vice president and assistant general manager, H. E. Chatterton; secretary-treasurer, A. E. Gorham; directors, M. A. Holmes, H. E. Chatterton, A. E. Gorham, C. E. Hagan, E. J. McCall, D. A. Warner and F. W. Garrett.

TRUCK AND BUS ACCESSORIES

The Weaver Safety Service Car should greatly reduce danger by handling inflammable liquids in this sealed container. A cigarette butt or match carelessly dropped by an employee or customer will often ignite gas or oil handled in open cans. The car owners, too, will not only appreciate



how much easier it is to fill the tank with this safety service can, but, also, how convenient and safe a means it offers to keep an emergency supply of gas or oil on hand in his garage. When gas is purchased it will enable one to measure the amount received and thus to insure full measure.

Tractor owners will find the safety service can of special value in carrying fuel to the tractor in the field. A reserve supply can thus always be kept on hand in the field without danger of ignition from sparks and no valuable time will be wasted when the tractor runs out of fuel.

Motor boat owners should find the service can especially adapted to their needs. It will not only prove convenient for trans-



porting the fuel when a new supply is required but also for keeping an emergency supply on board while the protection against fire which it affords is of extreme importance.

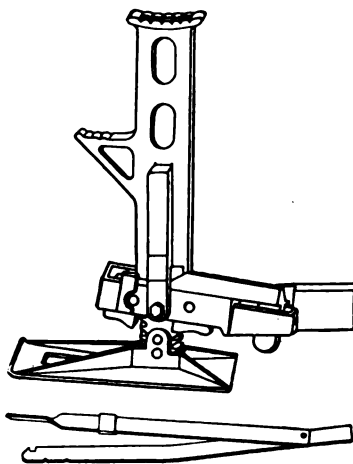
The construction of this service can is extremely rugged throughout to withstand the severest usage and abuse to which it may be subjected. It is made of heavy galvanized iron strengthened by horizontal ribs. The bottom of the can is especially reinforced to prevent leaks. The two-foot flexible steel armored hose is practically indestructible. It is equipped with two handles as shown in cut. Capacity 5 gallons. Weight 8½ pounds.

Manufactured by the Weaver Mfg. Co., Springfield, Ill.

The new Dextra Jack is claimed to have every conceivable feature that the car or truck driver might demand. There are close to twenty distinctive features, each almost equally important, that distinguish this Jack. Perhaps the most unusual feature is that it can be used under any make of car or light truck. This is the result of the jack being built so low. It has an overall height of 11 inches which

raises to 18 inches and it also has a "side lift" 7 inches high that raises to 14 inches. No matter how low the vehicle is built, the Dextra Jack can be used under either gas tank or bumper.

A long handle 32 inches in length that folds up to 18 inches for storage in the tool box enables the person to use the Jack some distance from the axle. In designing the base the hydroplane theory was used so that the jack could be slid under the car without lifting by the handle.

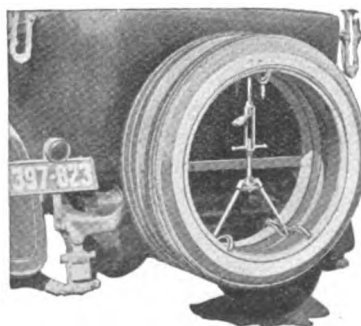


The base is big and wide and will slide under on muddy road as easily as on pavement. On soft or muddy surfaces, this big base gives ample support without the aid of a plank. With the ordinary Jack the user has to get down and reach under to throw the little lever that operates the reverse but with this new Dextra Jack the reverse trigger is operated by the handle. If it wasn't for having to move to change a tire the jack operator could stand in one spot and raise and lower the car.

Manufactured by the Dextra Manufacturing Co., 4844 Woodward Ave., Detroit, Mich.

The Markoml Duplex Tire Carrier for cars and trucks is an auxiliary device, instantly applied without the use of any tools, to carry extra spare tires and also to be used as a first class tire tool, spreading or contracting any split rim, it is claimed. It is automatically self-adjusted and may be transferred from one car to another, as it is universal in size and fits all rims. The material used is high grade malleable castings and cold rolled steel, rust-proofed and heavily japanned. It is very strong and rigid but light in weight.

A padlock inserted in the hole provided locks the tires and carrier securely against theft. Lugs are cast on the edge

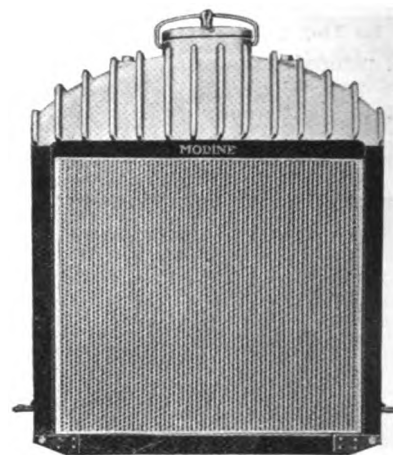


of pads, which hook over the edge of the rim and permit the carrier to be used as a rim contractor or spreader. The rim is expanded or contracted by means of the double-acting turnbuckle and is very practical for garage or private use.

Manufactured by the Markoml Co., Inc., 7-11 West Davison Avenue, Detroit, Mich.

Modine Suspension Radiator Core for Ford trucks is claimed to be one of the latest developments in truck radiator design and construction. Owners and operators of truck fleets will no doubt welcome it as a great help, because of the time saved in radiator replacement work. It is claimed that one of these cores can be replaced in a truck in 10 minutes' time, due to the ease and simplicity of assembling and attaching, which requires the removal of only four bolts and two small gaskets.

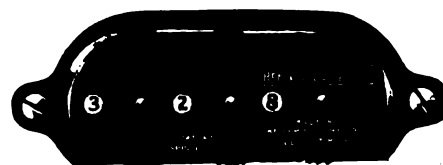
The construction is unique in that it requires only a three-piece frame. The cast iron bottom tank is entirely eliminated; this results in a very considerable



saving of weight. The core is equipped with a shallow reinforced header tank, and is drawn against the radiator upper tank by two cap screws, slidably attached in such a way as to allow sufficient flexibility to take up any strain resulting from expansion or contraction. The Modine Suspension Core Radiator is adapted to both truck and tractor service.

Sold by Smith, McCrory & Co., 468 College Avenue, Racine, Wis.

The Remind-O-Meter. This little accessory is designed to obviate the necessity of eternal vigilance and prevent annoyances incident upon frequent examinations of the gasoline tank of the car or truck. It takes up very little space and is made of 1-32 inch dead rust proof steel. The registering dials are solid brass with etched black figures, easily readable from seat, so that one can tell at a glance how far he can travel on gasoline he has in the tank. To use the remind-O-meter properly, first, fill the gasoline tank, second, note the last three figures registered by the speedometer and add to them the tank

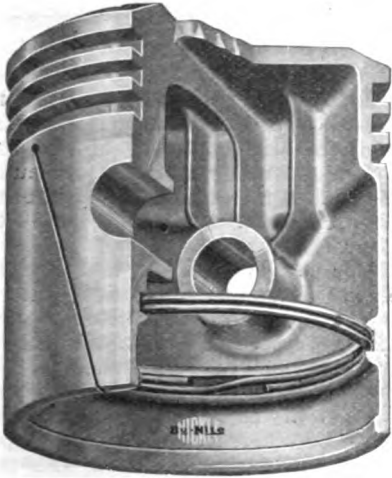


capacity in miles, indicating the result on the Remind-O-Meter; third, having done this, note the difference between speedometer and Remind-O-Meter readings as the journey progresses. This occasional glance will indicate the approximately correct distance one can safely go without replenishing the gas tank. For instance, if a full tank carries one 134 miles and the last three figures on the speedometer indicate 183, the total will be 328. Move the dials of the Remind-O-Meter to read 328 and follow direction three as above.

Manufactured by the Remind-O-Meter Co., 50 Moss Ave., Detroit, Mich.

Bu-Nite Pistons are not new, having been on the market two years. The design as shown, however, is a development that has been brought about by continued practical tests, and the results are satisfactory to the extent that the manufacturer guarantees to satisfy the customers with the results obtained.

The reduction in weight of a piston is a very important factor. It should not be



made too light, however, as it is subjected to extreme heat and the most severe punishment of any part.

The material must be of superior quality, having bearing efficiency, tensile strength and the ability to transfer the combustion heat into the cooling system.

The manufacturer claims that the Bu-Nite pistons have these qualifications, developed from the raw material in their foundry, where practical tests have proven that the ability of the material to maintain ring seats, piston pin bearings and the diameter of pistons, also the tensile strength and the ability to conduct the heat out of pistons. These qualities are due to the nickel contents and snug fit, permitting contact to cylinder wall by use of the compensating skirt and expanding ring, and are the encouragements to make the guarantee.

The advantage gained by being able to transfer the heat is of no little importance, due to the ill effect of breaking down the lubricating oil and forming carbon under the head of the pistons, which is in turn absorbed by lubricating oil, causing excessive wear on bearings and moving parts.

Manufactured by **Butler Manufacturing Co.**, 3234 West Washington Street, Indianapolis, Ind.

The **Oval Stop Signal** is a new and improved signal device which has a number of improvements and refinements which are specially featured. The materials used in its construction makes it impossible for the Oval Signal to rust, it is stated, while the parts have been assembled in such a manner that the signal cannot rattle nor can dust or water get inside.



The manufacturer states that every part of the lamp is of heavy gauge brass, heavily nickel plated, inside carries a beautiful silver mat finish, while the outside is finished in either highly polished nickel or double-coated with high-heat baked black enamel. Either finish will withstand all weather conditions.

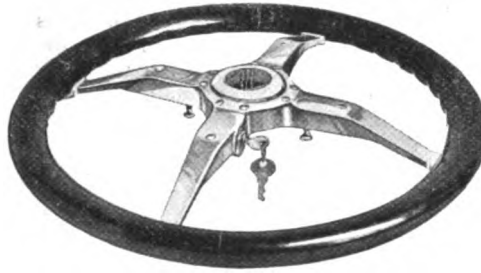
The word "Stop" is embossed on the best grade ruby glass with fire-baked black enamel background to make it visible in both daylight and darkness. A 21 candle power bulb furnishes the flash.

The switch is of a patented design, working like the hook of a telephone.

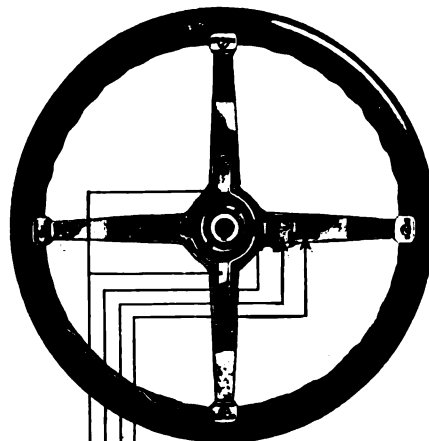
The signal derives its name from its "oval" shape.

Manufactured by **Silva Manufacturing Co.**, Cincinnati, O. Price, \$7.50.

The **New Lazear Lock Wheel** for Fords is the type which, when locked against theft, spins freely upon the steering post. Thus it makes it impossible to steer the Lazear locked Ford. The lock itself formerly was placed so that it was necessary



to insert the key from the underside of the wheel when unlocking it. This has been changed so that now the key is conveniently inserted from the side of one spider arm. Though unlocked in this manner no key is required to lock the wheel, as this operation is controlled by



**LOCKED
AGAINST
THEFT**

COLD ROLLED STEEL SPRING.

CORBIN LOCK.

COLD ROLLED, CASE HARD-
ENED LOCKING BOLT IN
LOCKED POSITION.

POSITION OF CLUTCHES
WHEN WHEEL IS LOCKED.

two thumb knobs placed on the underside of two arms of the spider. By pulling down and pushing back these thumb knobs the two hardened steel clutches, which secure the wheel to the steering post collar when in driving position, are drawn back and the locking bolt allowed to slide into position, permitting the wheel to spin freely on the steering post. This is all accomplished without in any way effecting the gears of the steering post.

The entire locking mechanism of the wheel is contained within the spider, and is completely protected by a wall of steel

which is claimed to be saw, file and chisel proof, around which the aluminum spider is die cast. Die casting of the spider insures absolute accuracy and the perfect functioning of various parts, it is said.

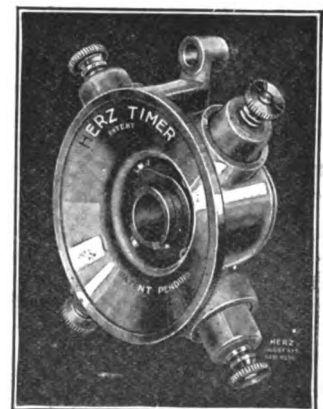
Another important improvement and one which dealers will appreciate is the case hardened steel screw cap on the Lazear wheel. Formerly the cap was put on and locked rigidly in position by a spring inset. On the new type the cap is made of cold rolled case hardened steel and screws into position, thus it permits easy removal for transferring the wheel to another car or for adjustment. When the wheel is locked against steering this screw cap also is locked securely by the locking bolt and cannot be removed.

Manufactured by the **Lazear Products Co.**, Chicago, Ill., successor to the **Lazear Auto Lock Wheel Manufacturing Co.** Price and literature on request.

The **Herz Hammerblow Timer** for Fords has been designed to meet certain conditions in the Ford magneto system, due to the high frequency of the electrical current used for ignition purposes. The timer consists of a hardened tool steel rod held in its place by a spiral spring pressed against another hardened tool steel stud when the cam actuating the instrument rotates. This gives an exceedingly intimate electrical contact, which is abruptly broken with the passage of the cam. The breaking of the current is sudden, which accounts for the saving of gasoline claimed in connection with this instrument.

It is common knowledge that occasional trouble in the Ford car comes from the vibrator on the coil which, being operated by a high frequency current generated in the flywheel, has a tendency to lag and to give inaccurate ignition. The sudden interruption of the current in the Hammerblow Timer tears off these would be sticking vibrators, which are thrown into action with every rupture of the current, giving the so desired regular click of the motor at low speed. With the Herz Hammerblow Timer, it is stated that the Ford motor can be run with a reduced flow of gasoline and the manufacturers guarantee that in each and every case it is possible to reduce the flow of the gasoline by a quarter turn of the rod immediately upon the application of this new Herz timer. The engine also idles much slower and picks up quickly, it is claimed.

The construction of the timer is exceedingly sturdy, as can be seen from the cut. The housing is made of cast manganese bronze, the moving parts are of hardened nichrome steel of specific char-



acteristics. There is no part to wear or to give way. The Herz timer, it is claimed, will last as long as the Ford motor and the saving in current pays for the instrument, the price of which is only \$5, in a very short time.

Manufactured by the **Pro-Mo-Tor Fabricating Corporation**, 182 Locust Avenue, New York City. Prices and literature on request.

(When Writing to Advertisers, Please Mention the MOTOR TRUCK.)

LEGAL POINTS

By SAMUEL WANT

THE evidence in a recent Missouri case discloses that when a car was receiving gasoline from a public station, some of the gasoline escaped from the hose, caught fire and burned the car. There was no explanation of how the gasoline became ignited or who did the act which started the fire. The motorist sued the owner of the gasoline station for his loss, and the court decided that in the absence of any evidence pointing to the cause of the fire the claim could not be upheld.

A RECENT decision in California adds that state to the number which give to the repairman of an automobile a claim superior to that of the holder of a chattel mortgage, although the mortgage is prior in date to the repairman's claim. The priority thus given the repairman is of a limited character. It does not cover such items as grease, gasoline or accessories which were not indispensable to effect the repair of damaged or missing parts.

Negligence.

O RDINARILY, where parties to an accident were each negligent, neither may obtain damages from the other for the resulting injuries. An exception to this rule is illustrated in a recent California case in which it appeared that a motorist passed to the left of the center of a street in "cutting the corner." At the same time another car was coming from the opposite direction, on the wrong side of the street, at a high speed. As the first car got to the right side of the street the two cars collided. In passing upon this situation the court said:

"That the driver of the first car was guilty of negligence may be admitted. But such fact will not bar his recovery, unless it be made to appear that such negligence was a part of the efficient cause of the collision; that is, there must have been a casual connection between his negligence in so doing and the injury complained of. At the time when the collision occurred, as shown by the record, the driver of the first car was driving his car upon the right-hand side of the center of the street, where he was entitled to travel, and the fact that in reaching such position he had negligently cut across the corner of the intersecting street was not a contributing cause of the collision, but, as appears from the evidence, wholly disconnected therefrom.

Clearly he was where he had a right to be and where, but for the fact that defendants were on the wrong side of the street and traveling at an unlawful rate of speed, the collision would not have occurred."

Railroads.

O NE of the ever-growing number of collisions between trains and automobiles at railroad crossings is dealt with in a recent federal case decided in Iowa. The case was a claim for damages by an injured motorist. His claim was based on the alleged failure of an oncoming train to give the customary warnings as it approached the crossing. The railroad's defense was that, granting the motorist's claim, the accident could not have happened if the motorist had followed the "stop, look and listen" rule before entering upon the crossing. In rendering judgment in the railroad's favor, the court gave the following definition of the rule referred to:

"The duty to stop is a relative one. It depends upon the situation of the particular case, the knowledge of the traveler has of the situation, and the reliance he may reasonably place under the circumstances on his opportunities for seeing and hearing without taking the last precaution of stopping. The authorities are quite in accord on the proposition that, if the view is unobstructed, so that an approaching train, before it reaches the crossing, can be seen, there is no occasion for special exercise of the senses of hearing and listening, and therefore there is no reason why he should stop for that purpose. On the other hand, if the view is obstructed, interfering with the sense of sight, then he must bring into requisition the sense of listening carefully and attentively; and if there is any noise or confusion over which he has control, such as that of the noise of horses feet, or the grinding sound of the wheels, or the ordinary noise of the vehicle, interfering with the acuteness of the sense of hearing, it is his duty to stop such noise or interfering obstruction and listen for the train before going upon the track."

Liquor.

A CASE just decided in a federal court in Pennsylvania seems to be the first judicial construction of the provisions of the national prohibition act relating to the forfeiture of an automobile used for the unlawful transportation of liquor. The car in this case had been loaned by the owner to a friend. The latter was arrested for using the car to transport liquor and was convicted. According to the evidence the owner of the car had no knowledge of the unlawful use intended to be made

of it. The federal prosecutor, nevertheless, insisted that the car was subject to forfeiture by the government. His contention was based on the fact that the forfeiture provisions of the law contain no exceptions in favor of innocent owners in such cases. The court refused to construe the law that way. It said:

"The admitted facts in the present case show ownership and want of knowledge on the part of the vehicle's owners as to the purpose for which the vehicle was to be employed. Without any other attending circumstances this is sufficient to warrant the court to order its return. It might be otherwise, if, from the reputation of the person intrusted with the vehicle or other circumstances attending his occupation or employment, the inference would arise that the owners had reasons to suspect that their property might be used for the purpose it was employed."

This is in accord with the decisions of the state courts under the various local acts.

White Slave.

A RECENT decision of the court of appeals of the District of Columbia holds that a chauffeur who drove two women across the Potomac to a point in Virginia for the purpose—known to him—of enabling them to meet men for immoral purposes, was guilty of violating the federal white slave law.

Fraud.

IT IS not always easy to determine when a misrepresentation will justify a purchaser of a motor car in rescinding the transaction. The rule is expressed to be that if the purchaser knew and saw what he was buying, the fact that there was a misstatement by the seller is immaterial, provided there is no actual fraud. In a case just decided in New York a man bought a used car that was represented to be a "Cadillac sedan, model 57 V." He saw the car that he was buying, was satisfied with it, paid the price and took possession. Later he discovered that the car was a Cadillac touring, model 57 J, with a special body. He then sued to recover his purchase money. The seller proved that he too had bought the car as a Cadillac sedan, model 57 V, and did not know of his error when he sold the machine to the plaintiff. The court decided that the plaintiff was not entitled to have his money returned.

Damages.

IN SUITS for damages for injuries sustained in automobile accidents the most serious claim against the motorist is frequently an assertion that as a result of the accident the claimant's

health and earning capacity have been permanently impaired. The West Virginia Supreme Court, in dealing with such a claim, held that damages on this ground were not recoverable upon mere proof of tubercular tendencies and other physical impairment disclosed by an examination after the accident, where the testimony left some doubt as whether these conditions had existed before the accident. The court held that the rule of law on this subject is as follows:

"Future consequences, which are reasonably expected to follow an injury, may be given in evidence for the purpose of enhancing the damages to be awarded. But to entitle such apprehended consequences to be considered by the jury, they must be such as in the ordinary course of nature are reasonably certain to ensue. Consequences which are contingent, speculative, or merely possible are not proper to be considered in ascertaining the damages. * * * To entitle a plaintiff to recover present damages for apprehended future consequences, there must be such a degree of probability of their occurring as amounts to a reasonable certainty that they will result from the original injury."

Injuries.

ORDINARILY a person cannot obtain damages for injuries sustained in an accident unless he can prove some specific act of negligence as the proximate cause of the accident, and the act must have been done by or on behalf of the defendant. An exception to this rule is that the mere happening of the accident, without proof of negligence, will give rise to a claim for damages by the injured person, if the cause of the accident was some unusual thing which in its very nature suggests negligence as its primary cause. For example, where the shaft of a wagon is driven into the rear of an automobile, this is usually in itself ample proof of negligence, entitling the motorist to damages. But in a recent New York case involving just such an accident the evidence showed that an automobile struck the rear of the wagon, driving it forward, and causing the shaft to strike an automobile just ahead. The court ruled that these facts absolved the owner of the wagon from legal responsibility to the injured motorist in the front car.

Mortgage.

WHERE a law makes it a penal offense to "sell or dispose of" mortgaged personal property unless the mortgage debt is paid, a crime is committed if an automobile owner, after mortgaging his car, removes it to another state. This was decided recently in a South Carolina case.

In another South Carolina case it appears that an oil company installed a gasoline tank in front of a dealer's store under an agreement of the latter that the tank was to remain the company's property, subject to removal by it when the dealer discontinued selling the company's gasoline. The dealer was thrown into bankruptcy by his creditors and his assets were sold as a

whole. The purchaser claimed that the gasoline tank was included in the sale, while the oil company asserted its reserved ownership under its agreement with the dealer. The court decided that the agreement was not legally binding as against the bankrupt's creditors, because it had not been recorded, and that therefore the purchaser at the bankrupt sale obtained a clear title to the tank.

Names.

WHAT'S in a name? A great deal, according to the courts, if the name is Hudson and is applied to conflicting products in the automobile field. A New Jersey corporation known as the Hudson Tire Company, manufactured and sold tires under the "Hudson" brand. A corporation was subsequently organized in New York under a substantially similar name, and sold tires under that name. It claimed the right to do so in New York, and to designate its tires accordingly, because the State of New York had granted it a charter fixing its name as indicated. But the New Jersey company was doing some business in New York and therefore brought suit to prevent the use of the brand "Hudson" on tires sold in New York by its rival. The court held its complaint justified and granted an injunction.

Trolleys.

A MOTORIST has a right to assume that street cars are running within the lawful speed limits. Accordingly, where the driver of an automobile proceeded to cross street car tracks in full view of an approaching car and a collision resulted because of the excessive speed at which the car was going, the failure of the motorist to properly estimate the leeway for crossing in front of the car cannot be regarded as contributory negligence to exempt the car company from liability for the accident.

Collision.

A CURIOUS tripartite accident is disclosed by a California decision just rendered. A touring car and truck collided, and after being extricated from the entanglement the truck struck a third vehicle before it could be brought to a stop. The defense of the truck owner was that the collision with the touring car had created a sudden emergency, and although he admitted negligence in managing the truck, he relied upon the legal rule that a person in peril, where immediate action is necessary to avoid disaster, is not legally responsible for a failure to exercise the care and presence of mind required under normal conditions. While conceding this rule, the court decided that prior to the accident with the touring car the truck was proceeding at an excessive speed, and that the momentum of this condition was still present when the second collision occurred. Hence the truck owner was liable for the collision.

Automobile Theft.

IN A CRIMINAL prosecution for the theft of an automobile the law will not permit the admission of evidence

of other thefts of cars alleged to have been perpetrated by the defendant. A recent Alabama decision reversed a conviction on this ground. The court points out, however, that if the other thefts had occurred at the same time, or as a part of a continuous series of thefts, following immediately one upon the other, proof of the other thefts would have been admissible in evidence. The decision in this case is based upon the rule that a defendant in a criminal case cannot be compelled to answer or meet any other charge than the one specifically set out in the indictment.

Joint Liability.

IN A RECENT Indiana case the question was whether there was a joint liability on the part of two corporations for an automobile accident. The two companies were engaged in hiring automobiles. They used the same office and garage, had a joint bookkeeper and telephone operator, and frequently used each other's cars and employees. The accident in question occurred when the chauffeur of one of these companies was driving a car owned by it, and for its business purposes. Upon this state of facts the court decided that the other company was not jointly liable for the accident.

Law Quirks.

A RECENT California case decides the two following interesting propositions of law:

(1) The law regulating the use of lights on motor vehicles applies to a train of vehicles consisting of a tractor motor to which was attached a wagon, an oil carrier and a vehicular cooking house.

(2) An automobile insurance company which pays or assumes payment of a loss on a policy issued by it, has the same right to sue the other party to the accident for damages that the insured motorist would have.

Liability.

WHERE the owner of a car drove in it to his country club and there delivered it to a repair man to be taken by the latter to a garage for repairs damages could not be recovered from such owner for an accident which occurred during the trip to the garage and which was due to the driver's negligence.

Write to the automobile editor if you have any perplexing questions.

Because of importance of motor trucks and tractors, an annual market for 60,000 head of horses has been destroyed and demands for hay and corn reduced approximately \$88,000,000.

Riding a motorcycle is the principal hobby of Daniel Frohman, a prominent theatrical producer of New York City.

Schools and colleges throughout the United States are to be enlisted in a national way to teach the coming generation all about highway engineering, automobile transport, traffic regulations and safety.

(Continued from Page 145.)

minals, or made from lead-antimony alloy if used for plate straps, plate lugs or other parts inside the cells.

If a gas flame is used for this operation, the gasses are adjusted so that the flame has two distinct parts, one being a ragged outside portion, while the other takes the form of a small inside cone or pencil of a different color. The hottest part of the flame is at the end of this inside cone and either way, toward the nozzle or toward the end of the outside flame, the heat becomes less intense. The tip of the inner cone is, therefore, used to melt the lead.

After the surfaces of the parts have been melted so that they flow together, the end of the burning bar is brought under the flame and sufficient metal is allowed to run from the bar to secure the desired appearance and a filled out joint. When melting lead parts, the flame should be brought against the metal momentarily, then taken away for an instant, because continued application of the intense heat would melt away portions of the lead that should be retained. No flux is used in this kind of work.

Every lead surface must be thoroughly cleaned with the scraper and a wire brush before burning is attempted, otherwise the parts cannot unite properly. During the burning operation, particles of dirt and scale will rise to the top of the puddle and these can be lifted out so that the finished surface will be smooth and unbroken.

After any joint has been burned, excess lead should be broken or cut away and the parts given a finished appearance with the scraper and a wire brush. Some joints can be rubbed into proper shape just before the lead solidifies, doing this in much the same way as a plumber wipes a joint.

If new plates are being used, the lugs will be found long enough and may even have to be cut off to make them of the same height as those on the old plates of the group.

If old plates are being used, it will, generally be necessary to build up the lugs to make them long enough. This is done by laying the plate flat on an iron or steel surface and with the surfaces well cleaned, placing two or three guide strips to make a form around the end of the lug. Lead is then melted into the space thus formed until it is as thick as the original part of the lug and of the desired length or height.

When the plates are made ready, the strap is prepared by cleaning it, making sure that the openings are large enough for the lugs, and by straightening it on a flat plate if it is bent out of shape even slightly.

The burning rack is then set up together with the spacers that accommodate the plates for the type of group being handled. This spacing can be determined from other groups of the same battery. The height of the spacer is also determined from other similar groups and the ends of the spacer are made of even height by raising and lowering the adjusting nuts.

The plate lugs are inserted through the holes in the strap and the strap is tapped

YPSILANTI SHOW.

YPSILANTI, the second city to hold a show in the circuit organized by the Michigan Automotive Trade Association, held a very successful exhibition, from a sales and attendance standpoint. The show was conducted by the Washtenaw County Automobile Dealers' Association, with O. C. Eckley of the Ypsilanti Chamber of Commerce, as manager. The show was held in one of the units of the Apex Motor Co.'s plant.

down solidly onto the top of the spacer. Guide straps are then placed around the edges of the strap so that these points will not melt through. The upper ends of the lugs are melted with the edges of the strap holes and sufficient lead added from the bar to make the top of the strap smooth and even. Finally, the edges of the strap is filed and the top brushed to make a neat appearance. Any lead that has run through the holes should be removed from underneath.

After the battery has been made ready to attach to the cell connectors and terminals, the first step is to test each cell with a voltmeter to make sure that the positive and negative terminal posts are in the correct position, according to the known design or according to the sketch made when the battery was taken apart.

The voltmeter will give a reading when the lead attached to its positive terminal is touched to the positive of the cell, while the other lead is on the opposite cell terminal. The vent plugs should then be removed and the accumulated gas blown from the cells. A shield of sheet metal should be laid over the filler openings between the opening and the parts to be burned. This shield can be moved about as the work progresses.

If the terminal posts are too large or too high they may be reduced with the post reducer or they may be either reduced or shortened with the end cutting nippers. If the posts are too low or too small, they may be raised or enlarged by using a post builder or nipple made from iron or aluminum and having its inside tapered to correspond with the desired post dimensions. This builder is placed over the post and the additional space filled in from the burning bar.

The connectors are prepared by straightening them if necessary, and by cleaning their ends with the file and wire brush. The openings through the connector ends are made of correct size for the terminal posts and the upper ends of these openings may be slightly tapered so that the melted lead will have an opening into which it can flow readily. The connectors are then driven

down over the posts with the wood mallet.

Care should be exercised to select the correct terminals according to their polarity, as positives and negatives are usually slightly different. Care should also be used to place the terminals in their correct position according to the battery design or according to the sketch made at the time of taking apart. The inside of the terminal holes and the outside of the terminal posts are then filed and brushed clean, after which the terminals are driven into place ready for burning.

When filling the openings above the terminal posts the edges of the hole and the top of the post should first be melted together. After these parts have joined, lead can be slowly added from the burning bar until the metal is brought flush with the top of the connector or terminal. The top of the joint is then trimmed evenly with the scraper and a drop of lead from the burning bar is placed in the center of the post and flowed evenly over the finished joint.

The polarity of the terminals is usually marked with "Pos" and "Neg" dies, or with plus and minus signs made with a die or with a blunt edge chisel. Letters or symbols are often placed on the terminals or on the cell connectors in order to show the kind of repair made, the date of the work and the station at which the work was done.

Lead terminal connections are attached to cable ends or else the end of the cable is burned into the terminal and, in turn, burned to the battery post. In some cases the end of the cable is inserted into an aluminum form to which the melted lead is added, while in other cases, the cable is placed in the opening of a lead connector. The cable insulation may be protected from the heat of the torch by wrapping a wet cloth about the cable. A neutral soldering fluid may be used in this work if required to make the copper and lead join properly.

Making Use of Scrap Lead.

By the use of proper moulds, most any battery station may turn most of the scrap lead parts into new parts with a saving of both time and expense. Every station should at least make its own burning bars. A tray-like mould having a number of grooves is used for making burning bars and the melted lead poured in slowly from one end and allowed to cool.

Other parts than can be made include taper terminals, terminal parts and plate straps. Terminal screws are formed by melting lead around the heads of brass cap screws in a special mould designed for the purpose. All mould interiors should be dusted with powdered chalk before the metal is poured into them.

In addition to the moulds, the equipment includes an iron melting pot into which can be placed old terminals, connectors and plate straps. Any brass, copper, steel or impurities will come to the top of the lead when it is melted over a gas flame and these can be skimmed off before the lead is used. A ladle for pouring the molten metal completes this part of the equipment.

Calendar of Conventions and Exhibitions

Feb. 11-18—Kansas City, Mo., Automobile Show, Kansas City Motor Car Dealers' Association, Overland Building; Manager, E. E. Peake.

Feb. 11-18—San Francisco, Cal., Sixth Pacific Automobile Show, Motor Car Dealers' Association of San Francisco, Exposition Auditorium; Passenger Cars, Trucks, Tractors and Accessories; G. A. Wahlgreen, Manager, 215 Humboldt Bank Building.

Feb. 12—Madison, Wis., Ninth Annual Show, Automobile Dealer Division, Association of Commerce; Passenger Cars, Trucks and Accessories; Don W. Mowry, Manager, Cartwell Building.

Feb. 14-16—Chicago, Ill., Convention, Illinois Retail Hardware Association, Hotel Sherman; Leon D. Nish, Secretary, Elgin, Ill.

Feb. 14-17—Philadelphia, Pa., 21st Annual Exhibit and Convention, Pennsylvania & Atlantic Seaboard Hardware Association, Inc., Commercial Museum; Automobile Accessories, Etc.; Sharon E. Jones, Secretary, 1314 Fulton Building, Pittsburgh.

Feb. 14-17—St. Paul, Minn., Convention, Minnesota Retail Hardware Association; H. O. Roberts, Secretary, 1030 Metropolitan Life Building, Minneapolis.

Feb. 14-18—Kalamazoo, Mich., Automobile Show, Kalamazoo Automobile Dealers' Association.

Feb. 17-28—Trenton, N. J., Automobile Show, Trenton Automobile Trade Association, Second Infantry Armory; Manager, Frederick Petry, Jr.

Feb. 18-26—Hartford, Conn., Automobile Show, Hartford Automobile Dealers' Association, State Armory; Manager, Arthur Fifoot.

Feb. 18-26—Albany, N. Y., Automobile Show, Automobile Dealers' Association,

State Armory.

Feb. 20-26—Bethlehem, Pa., Automobile and Accessory Show, Bethlehem Trade Association; Manager, J. L. Elliott.

Feb. 20-26—Grand Rapids, Mich., Automobile Show, Passenger Car Dealers' Association, Furniture Exhibition Building; Manager, M. D. Elgin.

March 11-18—Bronx, N. Y., Bronx County Automobile Show, Passenger Cars, Trucks and Accessories, 105th Field Artillery Armory, 166th Street and Franklin Avenue; Manager, H. G. Stiles, 2483 Tiebout Avenue, Bronx.

March 11-18—Newark, N. J., Automobile Show, Newark Automobile Dealers' Association.

March 11-18—Boston Show, Mechanics' Building.

March 13-18—Boston, Mass., Automobile Salon, Boston Automobile Dealers' Association, Inc., Copley Plaza Hotel; Manager, Chester I. Campbell.

March 13-18—Omaha, Neb., Automobile Show, Omaha Automobile Trade Association, Auditorium; Manager, A. B. Waugh.

March 15-18—Port Huron, Mich., Automobile Show, Port Huron Automobile Dealers' Association.

March 21-23—Ypsilanti, Mich., Automobile Show, Ypsilanti Automobile Dealers' Association.

March 23—Philadelphia, Pa., Sectional Meeting, Society of Automotive Engineers.

March 24—Detroit, Mich., Meeting, Society of Automotive Engineers.

March 24-26—Ann Arbor, Mich., Automobile Show, Ann Arbor Automobile Dealers' Association.

March 27-April 1—Oklahoma City, Okla., Sixth Annual Automobile Show, Coliseum, Oklahoma City Motor Car Dealers' Association; Manager, Edgar T. Bell.

March 28-31—Benton Harbor, Mich.,

Automobile Show, Benton Harbor Automobile Dealers' Association.

March 31—Chicago, Ill., Mid-West Meeting, Society of Automotive Engineers, "Various Commercial Fuels and Their Relative Characteristics."

April—Buffalo, N. Y., Second Annual Motors and Sportsmen's Show, Automobile Club of Buffalo; Manager, D. H. Lewis.

April 2-8—Battle Creek, Mich., Automobile Show, Battle Creek Automobile Dealers' Association.

April 27—Philadelphia, Pa., Sectional Meeting Society of Automotive Engineers.

April 28—Detroit, Mich., Meeting, Society of Automotive Engineers.

May—Trenton, N. J., Annual Convention, New Jersey Automotive Trade Association; Secretary-Treasurer, H. S. Moore, Trenton.

May 1-15—Scheveningen, Netherlands, Second Annual Automobile Exhibit; Secretary, No. 185 Spui, The Hague.

May 16-19—Chattanooga, Tenn., Convention and Exhibition, Southeastern Hardware and Implement Association (Alabama, Florida, Georgia, Tennessee); Secretary, Walter Harlan, Jacksonville, Fla.

June 11-15—Milwaukee, Wis., International Convention of Associated Advertising Clubs of the World.

June 19-26—Colorado Springs, Col., Summer Meeting, Automotive Equipment Association.

September—Rio de Janeiro, Brazil, Automotive Exhibition in Connection with Brazilian Centenary.

Sept. 18-23—Rome, Italy, Second Annual Meeting, International Chamber of Commerce.

Nov. 13-18—Chicago, Ill., Annual Convention and Business Exhibit, Automotive Equipment Association, Coliseum.

SOLD ON POWER FARMING.

The strengthening of the cotton market has developed a commendable interest in power farming in the south. As evidence of this interest, the following quotation is taken from the advertising copy of a large banking institution in Georgia, which has branches in the four largest cities of the state.

"When a farmer makes two bales of cotton grow where only one grew before—that's service. But the farmer can only do this when he is able to farm with modern facilities—tractors, cultivators and other power machinery, ample fertilizer and modern tools.

BABY TRACTOR.

While the orchards of California are alive with orchard tractors, the Great Divide reminds us that it is not to be forgotten that the baby trees are likewise machine tended. The Teague Citrus Nursery of San Dimas has thrown out the horse altogether. Its trees are gathered and handled from the nursery with trucks and while they are growing in the nursery, from seed bed to finished stock ready for sale, they are tended with tractors of the garden type.

Mr. Teague is very pronounced in his indorsement of the garden tractor over the horse. "It gets over more ground, goes through tight places such as narrow roads and short turns, where the horse would do damage or be impossible. And it never runs over a young tree or takes

a nip of a tender top. On the other hand, it is regarded as a money saver and a generally good actor."

As it works in this nursery the small tractor is not in any measure a toy or a plaything, but a very earnest and efficient worker. "While the improvement of certain features would be welcome," Mr. Teague says, "the baby tractor now is so good that in its work the horse cannot compete with it."

WETMORE TRACTOR REDUCED IN PRICE.

The list price of the Wetmore tractor is reduced to \$1185. In making this reduction the manufacturer states that the machine will be selling at considerable less than cost of manufacturing, but the change is made for the benefit of the dealers.

SHELTER MACHINE.

Agricultural economists and others have for years constantly hammered away at the idea that farmers should provide shelter for their machinery, but yet even a short trip through almost any agricultural community will show a number of cases where such advice is absolutely unheeded.

Prof. J. B. Kelley, head of the farm engineering section of the Kentucky college of agriculture, estimates that "open air housing" of machinery costs Kentucky farmers approximately \$3,000,000 a

year. Many farm implements are left in fence corners under trees or in fields where they were last used, with the result that rust and bad weather contribute toward heavy damage.

To prevent this loss, all machinery should be stored in a suitable house just as soon as the season's work is done, care being taken in putting the implements away that all parts are thoroughly cleaned and any parts that are apt to rust greased.

Many farmers are finding it helpful to make a list of the missing or broken parts while storing machinery so that these can be ordered during slack seasons.

TRACTOR SCHOOLS.

Preliminary arrangements are being made by the farm engineering department of the Kansas State College to conduct a series of extension schools in that state. The work will be carried on in connection with the local county agents. Several counties have already expressed their desire to have such schools and every effort will be made to make them strongly educational and beneficial.

Prof. Mark Havenhill will have charge of these schools, which will generally be of three days' length. The first day will be spent in discussing the general features of the tractor and tractor motors; the second day will be devoted to fuel, carburetors, ignition and lubricants, and the third day will be given over to field demonstrations.

BURR DYNAMOMETER

THE operation of the tractor as a power unit under different soil conditions and with different implements are of paramount importance to the tractor manufacturer. Years ago the railway operators found that they must know just what their performances were over any division, whether or not it would pay to cut down a certain grade or continue to operate over the same.

IF A certain type of locomotive was more efficient than another; if they were getting all the tonnage over a certain division possible and many other details.

In this connection it is stated that many of the railroads have provided themselves with complete "Dynamometer cars" manufactured by the Burr Co. of Champaign, Ill., which give a very complete record of train performance on a ribbon of paper showing from 17 to 22 different curves or performance records. A small portable machine of the same quality of manufacture for the tractor field has been manufactured by the company for a number of years and is known to the trade as the Gulley Tractor Dynamometer.

The tractor dynamometer as manufactured by the Burr company has the same high quality of workmanship which goes into the manufacture of their railway dynamometer cars, it is said, but is portable and therefore less expensive. It gives a ribbon paper record or curve which can be continuous and unbroken of any length or duration of test. This unique instrument is made in two sizes, one for 1500 pounds and one for 10,000 pounds draw bar pull, which should cover the portable field.

The pressure on the liquid in the dynamometer cylinder is transmitted to the recording instrument by means of a flexible metallic hose. The recorder usually is placed on a carriage of its own, simply for convenience, as this is readily changeable from one machine to another, although this recorder could be placed on the tractor or power unit, should a permanent condition arise warranting the hook-up necessary to show distance traveled. The distance traveled is obtained under the usual circumstance from the land wheel on the carriage which runs in the furrow or along side the load or wherever convenient. Naturally the smooth travel or path of this wheel is desirable. This land wheel is 24 inches in diameter and gears through a train of gears to the paper record roll.

There are two sets of gears provided which gives a paper travel of one inch to 25 or 50 feet of travel of the land wheel. The change of speeds can be made almost instantly. Provision is made for constant direction of paper travel regard-

less of direction of rotation or travel of land wheel. Tension springs are also provided with adjustments for proper paper tension.

Hydraulic pressure in the dynamometer cylinder is transmitted through the flexible metallic hose to the indicator in the recording instrument, which pressure is transmitted through levers to the pencil lever and the pressure recorded.

Means are provided of use of various springs to give as large a record on light loads as on heavy loads, variation in pull being magnified accordingly. With no load or pull the pencil is naturally on the zero or datum line. As the pull is increased the pencil line rises, giving an irregular line, showing pressure or pull of tractor or power unit.

The area between the irregular pressure line and the zero or datum line is integrated by an automatic integrator or area recorder and every square inch recorded by a second pencil. A counter is also operated for every square inch, which will show a total number of square inches on the indicator cards—without counting the notches in the area line on record. A clock is also attached to the recorder which makes an electrical contact every 10 seconds, which operates a third pencil.

An extra record or fourth pencil is provided which is controlled by the operator to give special conditions, such as starting, stopping and running into buried stumps or any unusual things which

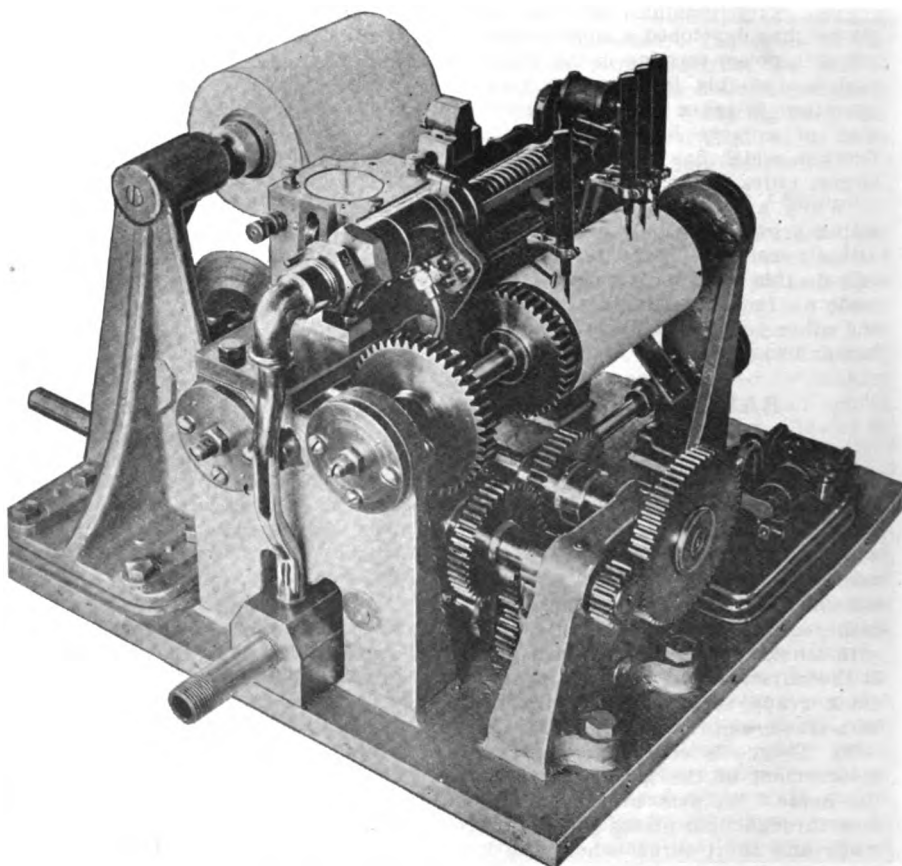
might arise or which you might wish to eliminate from the calculations.

It is readily seen from the above that computing the average pull, time and distance the horsepower can be obtained very easily by multiplying the area by a constant which gives foot pounds multiplied by the time gives the horsepower. The constant in a given test is as follows: Each inch in height on pressure curve represents a known pull in pounds. This might be varied of course by the use of different indicator springs. Each inch of paper travel represents 25 or 50 feet of travel. Therefore, every square inch under the pressure line represents a given number of foot pounds. This area is given either by the notches made by the integrator or area pencil or directly read from the counter.

CONSTANTINOPLE TRACTOR TRIALS PROBABLY IN MAY.

Postponement of tractor trials which were to be held at Constantinople owing to military activities in the neighborhood and general economic conditions, brings the hope among foreign trade promoters that American tractor manufacturers will manifest more interest in these markets this spring when it is proposed to hold the exhibition.

The assistant trade commissioner, Julian E. Gillespie, reported to the Department of Commerce that only three American companies were entered.



Burr Tractor Dynamometer with Pencils in Position to Trace Performance Curves of Truck or Tractor on the Paper-Covered Rolls.



THE trouble with the truck business today," said O. M. Vett, "or rather—if there is any trouble (which I ain't admitting there is)," he hastened to amend, "is that the owner and not the dealer is doing the selling."

"What's that—a preface to another of those Monte Christo yarns?" I asked. "You can spill more epigrams than any other man I know of," I said. "What's the explanation of this one?"

"Don't know nothing about epigrams," grunted Vett, "—gota long without the word 52 years and you don't need to tell me what it means now. What I do mean is this. We'll say a man comes into the dealer's place with an old truck he picked up maybe for a couple hundred dollars. It maybe never was a quality vehicle even in the old days, and time ain't improved it.

"He'll tell this dealer he wants a new truck if he can get a good trade. The dealer, scenting a sale, will make him a good offer for the truck in a trade and then the fellow will refuse.

"'No,' he'll say—'I can get more'n that for it from so-and-so.' Well they'll argue and maybe the dealer will advance his allowance until he's allowed more than his profits will rightly stand on the trade. Finally the deal'll go through, the fellow will drive off with the new truck, and there's the dealer left with a truck on his hands that must be sold before he can make his profit on the transaction."

"That's right enough," I admitted, "but still you must admit the dealer sold his customer a truck—"

"You missed the point after all didn't you?" laughed Vett. "I knew you would. The dealer did not sell the customer a truck—the customer sold the dealer a truck—See?"

(Continued from Page 154.)

spondents say, while Europe is groping in clouds of uncertainty. We must, of course, export a large percentage of our basic materials and of our manufactured products. Lending other nations a helping hand we shall, economists agree, see full restoration of the former demand for the product of American farms. But the European nations must themselves produce and export largely.

It is true, doubtless, as the bankers say, that the industries have to look for their rehabilitation to profits from operations conducted under much more strenuous competitive conditions than have prevailed within our memory. We must build up a new standard of engineering and industrial activity based on economy in the broad sense.

The Society of Automotive Engineers can contribute much of value in this connection. By virtue of the hearty cooperation of many men of high qualification it has the necessary ability and maintains the required thoroughness and speed in its work. Its members understand the recently emphasized fact that vague enthusiasm can never compensate for lack of clear appreciation of the matters in hand. They have sufficient self-confidence; otherwise they would not dare to undertake the "impossible," in the sense that only the impossible is worthy to be undertaken. Advice to "do better" engenders first a hope, then a belief, and finally a force.

Farm Motorization.

The society has been engaged for many years on matters relating to motor vehicle transportation. Transportation, the greatest artery of civilization, made this country and its unexampled former prosperity. In addition to providing essential distribution facilities for raw materials and articles of manufacture, it raises the general level of knowledge by promoting travel and intelligent comparison. The work of the members of the S. A. E. made possible the present development of the highway motor vehicle, which of course

complements and feeds railroad transportation. The major part of the highway vehicle development has direct value in and application to farm motorization, the fostering of which is now fundamentally important. The need for thorough going cooperation in the farm tractor and other automotive industries was never as great as it is now.

As has been stated by a British engineer, almost all forms of agricultural machinery that have come into general use in Europe during the past 20 years originated in America. This country is responsible for nearly every labor-saving device in wide use on the farm at present. The tractor of today makes possible better crops at less cost. The British writer concludes logically that just as the motor vehicle is driving the horse from the public roads, so will the motor tractor inevitably usurp the place of the horse on the majority of the arable farms of the world. And it is predicted that the ultimate tractor will be a universal field machine, highway haulage being by motor truck.

Research.

Following its decade of work in engineering standardization, the S. A. E. has undertaken recently a programme of research coordination and dissemination. This is based on the same sound principle as the standards work, namely, that many of the studies in which the automotive industries are interested vitally can be conducted to much better advantage, to all, jointly than severally. It is only common sense to cooperate and not remain decentralized with respect to these studies. Major research items now in hand are motor fuel and highways. Better and more economic fuel and highways can be had and it is desired to have them soon. The S. A. E. research department is making a preliminary study of gear tooth wear, including a search of relevant existing literature. The effect of humidity on fuel vaporization and engine performance will be investigated at some of the universities. Many elements of farm motor equipment require extended research.

STANDARDIZATION.

Engineering standardization has been a prime activity of the S. A. E. Standardization has been called in turn

1. The art of common sense.
2. The codification of experience.
3. The art of simplification.
4. Experience crystalized.
5. The science of elimination.
6. Cooperative simplification, and
7. The foremost economic force.

These are all more or less good names for it. Briefly, standardization limits waste and avoids unnecessary and inadvisable variety.

In the words of a leading European automotive engineer, the fear that standardization, even in the slightest degree, may result in the hampering of design is absolutely groundless. The passenger car and the motor truck firmly crystalized so far as one general type for each is concerned. This naturally has been a very large factor in their successful introduction and use. It is felt by many that the great variety of types of farm tractor is a big handicap to the agricultural equipment industry.

The profits from standardization begin with the first operation of fabrication of material or part, and increase in amount through the various stages of trade and commerce, until the user of the automotive apparatus is reached. He reaps the greatest benefit of all. This is a step in the direction of the as yet unattained economic equality as between producer and consumer.

Resistance of all kinds to the sale, operation and maintenance of motor equipment for agricultural as well as other uses must be reduced greatly. Nothing can be more conducive to this than rational engineering standardization, the invariable effect of which is to enhance the quality and decrease the cost of the products involved. Service, long discussed in many quarters, is yet largely an unsolved problem.

Basically, nothing is as necessary to motor apparatus maintenance as prompt, economical service. Here standardization is of the greatest assistance. The wider the use of the apparatus the more the need for standardization.

It is estimated by men in the best position to express an opinion that the saving that has already been effected by existing S. A. E. standards amounts to 15 per cent. per year, expressed in terms of the retail price of automotive products in general. The executives of the producing companies can appraise the cumulative savings to be had from wider and wider use of engineering standards and practises, and doubtless will direct the efforts of their engineering, production and sales departments accordingly. It is clear that economic facts cannot be ignored at this time. The truth of today has its root in the error of yesterday. There is trade advantage to any company in participating in the establishment and practise of intelligent standardization. Standardization is of great economic benefit in any design, generally and specifically.

In 1909 there were fewer than 10 S. A. E. engineering standards. There are now nearly 250 individual and group standards and recommended practises, these relating to the power plant, electrical equipment, parts and fittings, materials and general matters. The standards committee of the society, constituted of about 300 engineers working in over 20 divisions, is now engaged on hundreds of other subjects with a view to determining upon additional standards. The standards that have been established are widely used in the farm tractor and other automotive industries, but full advantage has not as yet been taken of the economic principle underlying them.

The Mississippi valley contains more than one-half of the 107,000,000 population of the United States. The opening up of rail transportation in the middle west made it possible for that section to become the largest producer in the world of grains and meat, and, in addition, to

establish within its borders more than one-third of the aggregate manufacturing activity of the country. In the further development that must be facilitated it is essential that farm equipment motor machinery be introduced into this and other territory throughout the world under as efficient and economic conditions as possible. As has been stated recently, every great event in the evolution of a nation is the lengthened shadow of some man or group of men for whom the event is the expression of character and the reflex of aspiration.

The only way in which the automotive industry can advance is by helping others, serving general demands and exigencies. To make good contact with the switchboard of prosperity as soon as possible it is necessary to follow the best established modern methods, some of which at least, such as engineering standardization and scientific research, it is clear should be availed of promptly, aggressively and widely.

NEW TYPE OF SWEDISH TRACTOR.

A new type of tractor which is the invention of two Swedish implement designers is being developed in America. It prepares the ground for seeding in one operation, the work being done by a series of spade-like blades operated somewhat after the fashion of the forks on a hay tedder. According to claims made by the machine, it will prepare three acres of land per hour to a depth of 16 inches, using one gallon of gasoline.

JUNIOR MECHANICS COURSE AT ILLINOIS.

In connection with the Corn Growers' and Stockmen's Convention which will be held at the University of Illinois the last two weeks in January, Prof. E. W. Lehmann of the farm mechanics department has arranged a special programme to be given in junior mechanics. Two one-week courses on tractors have also been scheduled to follow the convention immediately, and in addition special three-day power farming courses will be held in various parts of the state in co-operation with county agents.

Edward Hall is handling Crystal White gasoline in his new filling station at Bronson, Kan. This brand of gasoline is refined by the Commonwealth Oil & Refining Co. of Bronson.

When Is Oil "Good?"

(By WILLIAM F. PARISH.†)

A PETROLEUM product is good or poor only as it suits, or does not suit, the condition for which it is used. A watch oil may be exactly right for a watch; it will lubricate for years without evaporation, it will not gum and will not cause pitting of the fine polished parts. It is perfect for the purpose for which it is made. However, if this watch oil was put into the cylinders of a steam engine, it would fail to lubricate, and would immediately become a "poor oil," not thru any loss of intrinsic value for it is still the 100 per cent watch oil, but thru the fact that it was not being used under conditions suitable to its nature. Conversely, citing an example of a perfect steam cylinder oil giving satisfactory performance in conjunction with the water carried over in the steam coating the valves and cylinder walls with a thin but sufficient film of oil, allowing lubrication to be carried on with a very small amount of oil—even though a considerable amount of this oil accumulates in the boiler, it does not cause trouble. This can be called a 100 per cent steam cylinder oil. If a few drops of this same oil were put on the delicate mechanism of a watch, the watch would stop, and the oil would then be graded "very poor." A spindle oil can be almost perfect for the reservoir of a fast-running cotton spindle, while the same oil used on a stone crusher would cause damaged bearings and put the machine out of action, due to its being a "poor oil." The oil entirely suitable for the heavy stone crusher would stop the cotton spindle, and in consequence, would earn the term, "poor oil." A very fine fuel to be burned under furnaces, and giving the best of satisfaction as a steam producer, would cause great trouble in the bearings of the mill. Conversely, the oil used in

the mill bearings would not always give as much satisfaction under the boilers, as the fuel intended for that purpose, which is proof that the money expended in producing and refining an oil means nothing to the well-working of the product, if it is placed outside of its field.

Kerosene is good for lamps when the lamps burn brightly and do not smoke. If the kerosene was made better in that more money was spent on its production, and it smoked and did not burn brightly, it would be a poor burning-oil, and not worth the price paid for it. With fuels, the 72 Baume gravity gasoline in use when the automotive industry was young and when fuel was plentiful, was a good fuel because it was entirely consumed in the engines that were especially adapted for a fuel of that light volatile nature. While the engines were continued, the fuels became heavier and not as suitable for the engines, and the term "poor fuel" was given them. As a matter of fact, the present fuel is much better in many respects than the old lighter fuel, except for the basic fact that it is not as suitable for the engines in which it is used. This is not the fault of the fuel as such, but rather the fault of engine.

The present motor lubricants are passing thru a very trying period. They are being made with more care and at greater expense than ever before, and yet there is a general opinion on the part of the motoring public that something is wrong with the oils. The general complaint is that they become very thin after a short time in the engine, and that the use of the oils produces much carbon in the cylinders, necessitating more frequent cleaning. The lubricating oil is taking the blame for the unbalanced condition of the engine and the fuel. If the fuel was suitable for the engine, (which authorities seem to agree it is not), then our motor oils would be much cheaper

and more suitable for the engine. The fuel being "poor," which means that it is no longer adapted to the engine, has brought forth a series of events that make it necessary to do many things unthought of when the industry was new, and the fuel was "good." The matter of removing carbon from engines in the days of not longer than ten years ago, was never considered serious. Today, carbon must be removed every two to five thousand miles, and under some conditions, the evil effects of carbon are noticed much sooner. This carbon condition is the reason for the introduction of many "dopes" intended to produce clean engines. Carbon causes wear and loss of power by stopping the action of the piston rings in their grooves. Carbon causes preignition and pounding, and the consequent straining of bearings and parts. If carbon could be eliminated, the entire motoring public would be greatly relieved, and would undoubtedly run up greater mileage in consequence. There is no question but that troubles in operation, such as excessive carbon, traceable directly to the present unbalanced condition of the engine, fuel and lubricant, have brought a considerable reduction in the use of cars.

The wear in the cylinders has introduced an entirely new and profitable industry, engaged in the re-grinding of cylinders and the fitting of over-sized pistons, estimated as affecting at least one million cars per year. The piston ring manufacturers have extended their operations until rings are one of the easily obtained articles of commerce. This is due to the attempt of the motor owner to prevent some of the more noticeable conditions due to the engine and fuel being no longer in balance.

Why should the automotive engine require a new set of rings every season, as is becoming the practice? Steam engines will op-

†Member Consulting Lubrication Engineer, Chicago, Ill.

erate on the same set of piston rings for years, it being an exceptional condition when the rings have to be removed. The steam engine and its lubricating oil have never been out of balance. Lubrication of the steam cylinder is nearly perfect, and as a consequence, the rings wear but little. The steam cylinder oils are "good oils" because they can perform good and useful service in preventing wear and replacements. If all the boiler feed-water in the world would change in nature to an extent that the lubrication of the cylinders and valves of the steam engines would suddenly become impossible, the classification of steam cylinder oils would change from "good" to "bad," as soon as the trouble would make itself felt.

Lubricating oil is used for the purpose of preventing friction and wear. A "good" oil is one that will prevent the most friction and wear. When wear takes place, or when there is so much friction in the moving parts that the speed or power is affected, then the oil is not doing its work. If the wrong oil for the work is being used, then it is "poor" oil for that particular machine. The fact that it may be a most excellent lubricant for several other uses, will make but little impression in the owner, whose machine is wearing out. If a cheaper oil, in that it is not as expensive to make and buy, will allow the machine that is wearing out to be saved; then the cheap oil becomes a valuable article and is raised immediately to the "good" oil classification. Good oils are therefore suitable oils; poor oils are those that are not suitable. When an engine is being operated under conditions that are changing in such a way as to affect the lubricant, a "good" oil can become a "poor" oil as these conditions affect it.

In the case of the present engines of our tractors, trucks and cars, the fuel is not being entirely disposed of by the engine, a considerable part of it being too heavy to be burned. Therefore, it does not volatilize and does not enter the engine as a gas, but a large portion of it actually drains into the engine

in its original fluid state. Some of this liquid is finding its way to the crankcase, and is combining with the lubricating oil. This brings about what is now known as the dilution problem.

Dilution of the lubricating oil is so rapid in the winter, that the original character of the oil is lost entirely after a few hours working in the crankcase. The fuel that escapes to the crankcase, and there combines with the lubricant, thins down the lubricant until it resembles kerosene more than it does lubricating oil. In this way the very finest and most expensive of motor oils will change so rapidly in the engines, that all the original characteristics of the lubricant are lost, and the mixture that remains is neither a "good" fuel nor a "good" lubricant, but is a "poor" mixture, which is discarded after it has done all possible damage to the engine.

The very fact that these mixtures are taking place, is evidence of the unbalanced condition of the engine and the fuel, which is ruining "good" lubricants and making "poor" lubricants of them. When the engines were using the more volatile fuels, which were in consequence entirely consumed, there was no condition of the thinning out of the oil, as we have today. It required less oil to lubricate a motor per thousand miles, and the oil was a better motor lubricant to start with because it was made for the engine, and not to combat the dilution problem, as is necessary with the present day lubricants. All motor oils are now made very thick and heavy, so when they are put in the engine, and are contaminated by the fuel, they will nevertheless retain some of their body and do part of the work for which they were intended. The motor oils of the old days were made of the best of the neutrals, and these oils were particularly adapted to the mechanical needs of the engines. Today, the same oils are used mainly by Eastern oil manufacturers in producing motor lubricants. The heavy steam cylinder oils are carbon producers when used in the internal combustion engine. Most carbonization trouble

is the result of using these heavy oils, and these heavy oils are necessary because the heavy and only partially volatile fuel ("poor" fuel), makes the use of the former suitable and good lubricants, impossible.

There are several solutions to the present unfortunate condition of engine, fuel and lubricant. The petroleum industry seems to have reached the limit in regard to the volatility of fuel. Authorities agree that fuel will be less volatile as time goes on, until we find a fuel other than petroleum origin. The leading engineers of the automotive industry state that they have about reached the limit of development of the present engine. They cannot utilize more of the present fuel than they are doing and they do not see how it will be possible to use as much, if the fuel is made heavier. **One solution is to give up the present engine and build something else.** This means going to the steam engine or turbine, the electrically propelled vehicle, or to some other type of internal combustion engine. **Accepting any of these suggestions to change the design of the present engine, would mean the expenditure of billions of dollars.** The ten million engines now in use cannot be changed over. No one has offered any solution, beyond the experimental stage, and there are many objectionable features to those that have been offered; conditions of operation may be as serious as the present condition due to the unbalanced engine and fuel.

For instance, with the steam engine, the boiler upkeep is affected by the nature of the water, and also by the lubricant used in the engine. It is necessary to have steam systems that are continuous, the water being condensed and used over again. As the steam cylinder must be lubricated, part of the oil gets into this circulating system and causes damage to the boiler. The incrustations from the water also cause damage. With the Diesel and the constant pressure types of the internal combustion engine, the great economy of engines of this type requires that they operate on

SERVICE MODEL 12

full load the greater part of the time. When the load is variable, the efficiency drops. They are not flexible enough, and must be built very heavy. The electrically propelled vehicle has well-known limitations as built at present, mostly due to the natural limitations of the storage battery. When we progress to a point where the electric current can be utilized direct, without the storage battery, we will have a simple means of locomotion. However, that time is in the future, and the transition from what we have, and what we are prepared to build and are building, will take some years and will involve the expenditure of billions.

The situation, as far as the internal combustion engine and the available fuel is concerned, seems to be at a deadlock, where conditions are bound to become even worse, before they improve. The only immediate solution of the problem seems to be to treat the mixed lubricating oil and fuel, while the engine is in operation, and to return the fuel portion to the cylinders to be consumed, the regenerated lubricating oil to go back to the crankcase.

This process is being worked out by a group of engineers devoting much time to the solution of the problem. The apparatus has been perfected to a point where it has been in actual operation and under observation on trucks, tractors and passenger cars, for several years. The results of the use of this apparatus have been that the oil in the engine has been kept at approximately its original body. All the fuel which leaked into the crankcase and has been caught by the lubricant, has been removed, and the recovered fuel has been converted into power in the cylinders, thereby eliminating a double loss. The oil, thinned down by the fuel, has been regenerated and cleaned, and after cooling, has been returned to the crankcase.

The oil in these regenerating systems actually improves with use. The carbon in the engine gradually disappears. The engine remains in its original condition, due to proper lubrication, for much longer periods.

The Red Pyramid, Model 12, is a $\frac{3}{4}$ -ton speed truck, with 128 in. wheelbase, built along practically the same lines as the one to 1 $\frac{1}{4}$ ton speed truck, Model 12. The price is \$1240.

Specifications are as follows: Engine—Midwest, heavy-duty type, 3 $\frac{1}{4}$ in. bore and 4 $\frac{1}{2}$ in. stroke. Cylinders, cast en bloc, with upper half of case. Overhead valves—push rods inclosed. Extra large, heavy-duty crankshaft. Force-feed lubrication; oil pumped by self-priming gear pump. Removable cylinder heads. Horse power, actual 32 at 2000 R. P. M.

Carburetor—Plain tube type with hot air stove and hot spot manifold.

Ignition—Battery. Remy distributor.

Cooling—Continuous tube and fin type core. Pressed steel radiator shell. Air drawn through radiator by 16 inch fan. Thermo-Syphon system of circulation.

Clutch—Single dry plate clutch, 10 inches.

Transmission—Selective type—three speeds forward and reverse.

Propeller Shaft—2 $\frac{1}{2}$ inch tubular shaft.

Front Axle—"Service." Drop forged "I" beam section of alloy steel, heat-treated.

Rear Axle—Timken spiral bevel. Nickel steel differential and gears. Chrome-vanadium steel shafts.

Brakes—Internal expanding cam actuated. Both brakes being inside of drums avoid interference with

skid chains.

Control—Left hand drive, center control.

Steering Gear—Ross worm and nut type.

Frame—Pressed steel channel section 5- $\frac{7}{8}$ " deep by 3" flange width by $\frac{1}{8}$ " stock.

Springs—Semi-elliptic front and rear.

Chassis Lubrication—Automatic splash feed shackle bolts; one filling lasts 1200 miles.

Wheels—Wood artillery type—12—1 $\frac{1}{2}$ " spokes.

Tires—Pneumatic cords. 32 x 4 $\frac{1}{2}$ front and rear.

Gasoline Tank—In cowl—12 gallon capacity.

Wheelbase—128".

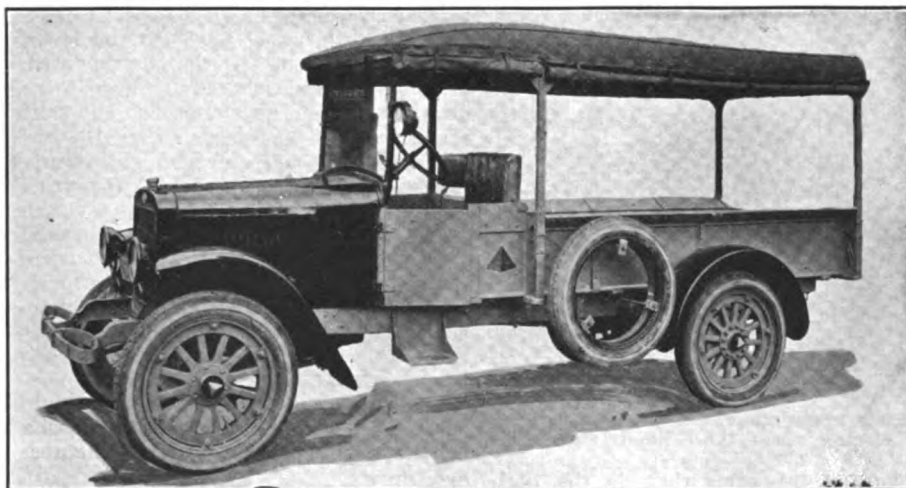
Tread—56 $\frac{1}{2}$ ".

Gear Ratio—6-1-9 to 1. Speed 25 to 40 M. P. H. Optional 5 $\frac{1}{2}$ -1; 6 $\frac{7}{8}$ -1.

Chassis Weight—2720 pounds.

Equipment—Remy electric starting and lighting equipment, oxide battery, electric head lamps, cowl light, tail lamp, electric horn, jack, tire pump, set of tools, oil can, spring bumper, front fender, step, instrument board, gasoline tank, toe and floor boards, speedometer, extra rim, seat cushion, tire repair kit.

Chassis Dimensions—From cowl to rear end of frame 126-11-16"; cowl to center rear axle, 87-15-16"; center rear axle to end of frame, 38-3-4"; cowl to back of seat, 31-11-16"; cowl to front of seat, 13-7-16."



Service $\frac{3}{4}$ -Ton Truck Follows Closely Lines of 1 $\frac{1}{4}$ -Ton Job.

Cutler-Hammer Gear Shift

Simplicity and Ease of Operation Mentioned as Salient Features of Newly Developed Unit Which Operates from Finger Lever on Wheel Quadrant.

THE Gear Shift Department of the Cutler-Hammer Manufacturing Co. has developed a smaller, simpler gear shifting mechanism, which, while not previously announced to the trade, has already been put to more than a year's actual service on several motor cars, and performances closely checked. Its development is the result of the eight years of work on gear shifting devices, and the desire to produce a small, simple and inexpensive mechanism. This new gear shift operates with apparently no application of energy. No magnetic force or electricity is required—yet all the advantages of pre-selection of speeds by means of a small finger lever on the steering wheel quadrant are obtained in the same manner as with the magnetic type gear shift made by this company and used on Premier cars. The shifting mechanism occupies but little space and weighs no more than the parts it replaces. It is mounted on top of the transmission as shown in the illustration figure 1, the latest type being so small that the enclosing case occupies only the space between the transmission case and the floor board—the Elgin car at the Chicago and New York Shows having this latest model gear shift. It will be noted that on the Cadillac car the hand lever is replaced by the automatic gear shift mechanism and the emergency break lever is moved to the extreme left side. The entire front seat compartment as shown in figure 2 is clear.

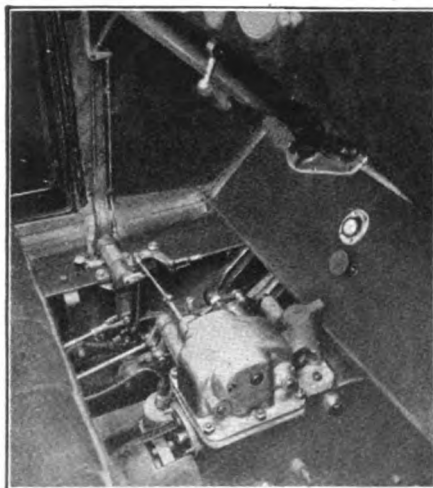


Figure 1.
How the Front of the Elgin Car Looks with C-H Gear Shift. Note Compactness of Mechanism and Method by Which Unit Is Mounted.

FIGURE 3 gives another idea as to the size of the casing that holds the entire gear shifting mechanism, while

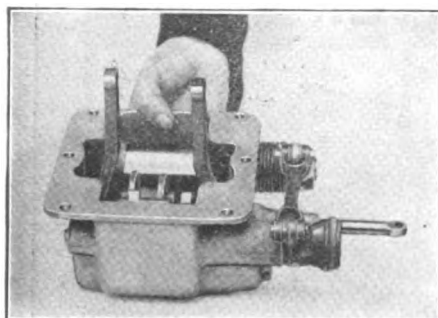


Figure 3.
Looking Inside the New Gear Shift Enclosing Case. Note Small Size.

in figure 4 the cams that do the real work are shown. These are each made of one single piece of steel, machined and

provided with different cam profiles. In other words, each is a set of cams made in one piece each mounted on cam block shafts.

With a given speed pre-selected by means of the finger lever, throwing out the clutch is all that is required to accomplish the result. Coasting by releasing the clutch pedal part way without shifting is also possible, since a gear change is not made unless the pedal is moved past a certain point.

The movement of the selector lever on the steering wheel quadrant, through the various linkages, moves a pair of roll levers inside the gear shift casing into the position corresponding to the speed selected. Then when clutch pedal is depressed the cams are rotated, one roll lever being moved into the selected gear position, and the other, held rigidly in the neutral position. Initial movement of the clutch pedal can take place without moving the operating rod of the shift, this being accomplished by means of a slip link.

Each of the two roll levers act with a moving pivoted fork, each being free to be moved forward and backward independent of the other fork and roll lever. With the case and its contents mounted, arms extending from the shifter forks drop down into the transmission and shift the gears into the speeds selected.

The cam blocks referred to previously operate on two sides of the rollers carried by the roll levers. Pushing the clutch pedal forward moves these cams through a limited arc in such a way as to move the roll levers forward and backward.

In reverse position the one roller is opposite neutralizing cams, and the other is held between the upper cams of the blocks which causes the forks to neutralize the gears and throw them into reverse. The rollers are held in position by the cams, preventing the slightest overthrow.

In neutral position the rollers are held between the neutralizing cams, while in

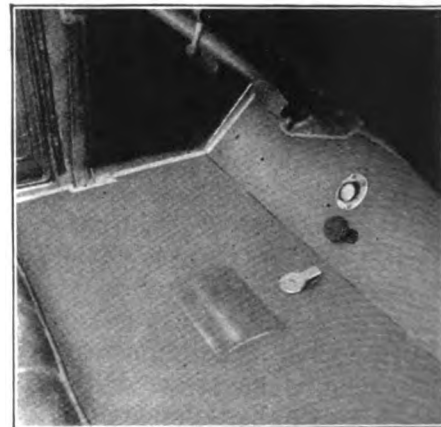


Figure 2.
New Type C-H Gear Shift Mounted on Cadillac Chassis. New Design Does Not Protrude Through Floor Boards as in the Picture.

the next position one roller is still between neutralizing cams and one between a shifting cam and an overthrow cam.

To actually operate this gear shift is the only way to realize fully what it accomplishes, and to pick it up and look at it and the few parts is the only way

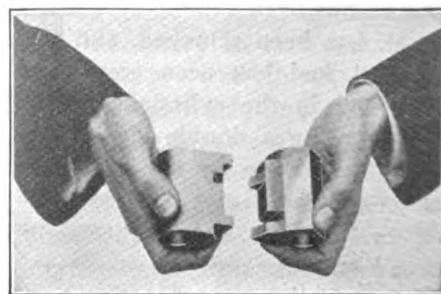
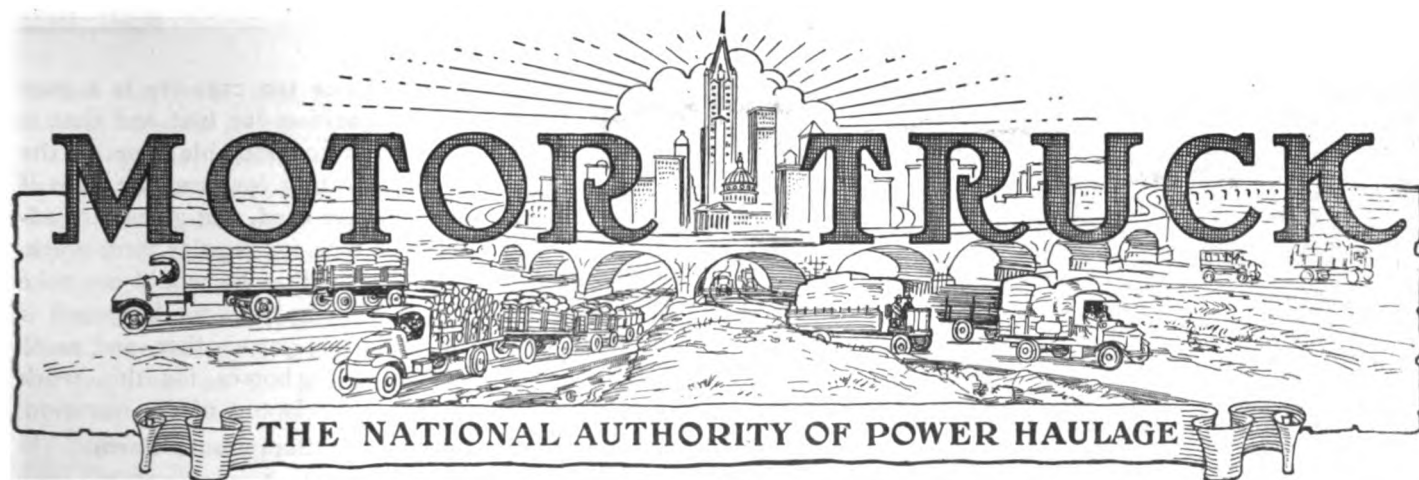


Figure 4.
The Cam Blocks Are Each Made of One Single Piece of Machined Steel.

to know the simplicity and smallness of it. The unusually clean design of the unit is apparent at a glance.



VOL. XIII. NO. 4.

PAWTUCKET, R. I.

APRIL, 1922.

Why Do Farmers Buy Motor Trucks?

This Article Tells You—

Reasons Vary with Individual, According to Nature of Agricultural Operations, But Saving of Time and Money Is Responsible for Majority of Purchases.

WHY do farmers buy motor trucks? The answer is obvious. Because they save time and money; a fact that may be well illustrated by citing a few instances of the result of a personal canvass among several agriculturists who are enthusiastic owners of motor trucks.

Two farmers of those interviewed use their trucks exclusively for hauling milk to a retail

market, delivering their product in quicker time than formerly, being able to start later to cover the distance to town, returning earlier in the morning, giving them more time to attend to farming operations. Four others used trucks to deliver produce to the city wholesale market finding that they were thus able to return home earlier and accomplish more farm work than when horses were used to make the trip.

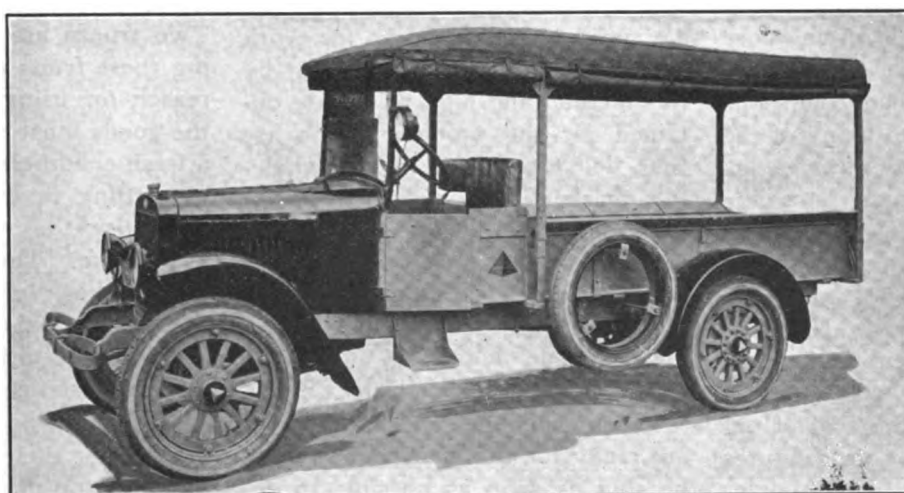
ONE used a truck for buying cows and calves as a side line with his regular farm work, visiting the wholesale market once a week, buying beef or hogs which he butchered and sold locally. The truck which he uses widens his buying field, enabling him to cover long distances daily, take beef cattle from the farmer within a few hours after receiving word that the cattle are for sale, allowing him to do his regular farm work besides.

Many other farming lines

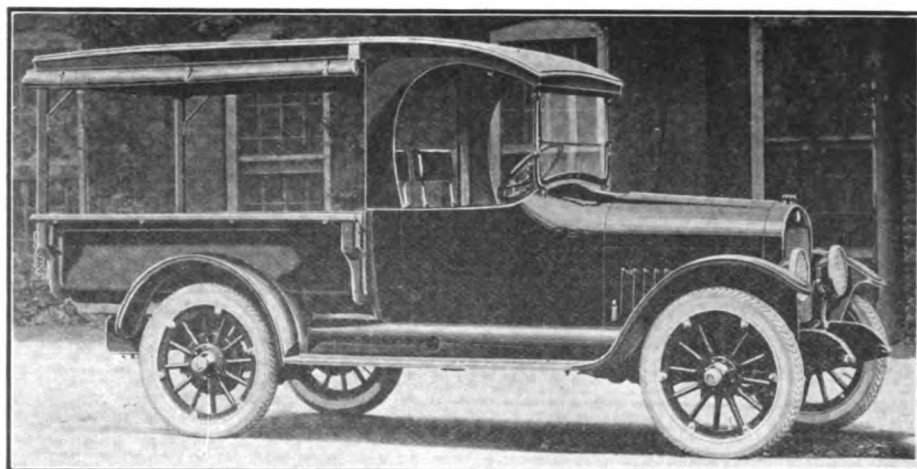
were also shown, including hauling wood, stone, ice or fruit, which gives one an idea of the diversified use to which the motor truck may be used in farm work.

Delivering farm milk to retail

customers is as much a part of farming as the growing of crops, raising cattle or any other branch of this industry. Often this source of income is the chief of many farmers. This naturally calls for his strict attention 365 days in the year with no vacations, as the milk must be delivered regardless of weather conditions or the condition of the roads. This often means long hours away from the farm and a long drive in the early morning over roads which are in winter months well nigh impass-



Type of Truck Much Used by Farmers Who Peddle Produce to City Residents. Vehicles of This Size Also Are Much in Demand by Milk Route Operators.



Another Type That Meets with Approval of Small Farm Owners Who Desire Light, Speedy Vehicle for General Work. Note Convenient Curtains.

able for horses due to slippery conditions.

Henry Caldwell, North Attleboro, Mass., gives as his reason for purchasing and using a truck for delivering milk that his driver is able to leave the farm later in the morning, arriving in the nearby city at the regular time to make delivery, deliver the milk in hours less time, and return to the farm around nine o'clock, saving all told about three hours time. The truck is then used for other purposes, such as hauling grain or produce, while the driver is left free for other work about the farm.

E. T. Westcott, Seekonk, Mass., operates a large dairy in connection with his farm, peddling around 900 quarts of milk daily in a nearby city. Two $\frac{3}{4}$ -ton trucks are used for this purpose, later in the day being used to pick up milk from surrounding farms, as his farm is not of sufficient size to raise the needed supply.

This country trip is often more difficult to cover than is the city trip because of the bad conditions of the roads leading to many of the farms from which he receives his supply. But the truck does the work easily enough.

Both milk dealers report that they find that trucks not only save time, but money as well. No accurate accounting system is kept of truck operation but statement is made that although the cost of operating the trucks per year figures slightly greater than when horses were used, still the saving in time and the additional amount of work

done more than offsets this item and actually shows that the truck performs the work at less cost.

Hauling Produce to Market.

Sylvia Smith, Plainville, Mass., farmer and market gardener, states that his reason for buying a truck was to enable him to reach the nearby city market early in the morning with his load of fresh vegetables and sell them to the peddlers who arrive early to buy their loads for the day. Formerly it was necessary for Mr. Smith to start for the city the night before, put up his horse at a stable after placing his wagon on the bridge, and sleep part of the night in a hired room. The balance of the forenoon after the produce had been sold was taken up in returning to the farm. A day was required for the trip and the farm work suffered accordingly.

Trips are now made from the farm in the early morning hours, while the return is often made before nine o'clock and the rest of the day used advantageously for work about the farm. No time is lost by this method and high prices are obtained for the produce which are thus delivered fresh to the wholesale market.

Byron Allen, North Attleboro, Mass., raises cauliflower and cabbage for the late fall market, piecing in between seasons by running his farm and delivering new milch cows for a local cow dealer.

When cabbage and cauliflower are ready for the market they must be sold as soon as possible to obtain the best prices. Mr. Allen finds that an investment in a good

truck of one ton capacity is a paying proposition for him and that it saves him considerable time on the road, operating for less cost than if horses were used, and gives him additional time for regular farm work.

He states that he would not take twice what he paid for his truck if he could not get another, and as to returning to horses for this work that is entirely out of the question.

Hauls Supplies to Farm.

David Peck, Seekonk, Mass., uses several trucks to deliver the products raised on his farm to the nearby market, as larger loads can be carried on the trucks than by horse drawn vehicles, the time consumed in making the trip is less, slippery roads are negotiated as easily as when dry, and the trucks can be used to good advantage in hauling back supplies to the farm from the city. As to cost of operation compared to horses, the trucks have the best of it according to the figures of Mr. Peck, which show that it costs on an average of less than \$1.00 a ton to deliver produce by truck, while with horses the average cost per ton was formerly approximately \$1.33, these figures being figured on a yearly mileage basis including wages, depreciation, etc.

Raises Fancy Fruits.

J. N. McGregor, Sheldonville, Mass., operates Pine Knoll Farm and specializes in raising extra fine peaches and apples. In the fall these must be delivered to either of two markets, one 30 miles from the farm, and the second 15 miles. Two trucks are kept busy delivering these fruits and he gives as his reason for using motor trucks that the goods must reach the market in a fresh condition and show no signs of settling in the packing baskets otherwise the wholesaler will not buy them. The first season he used horses, delivering the fruit to the nearest express station on the railroad and prices obtained were far from satisfactory.

The following year he purchased a truck for this work and since has obtained top price for his farm products. Operating expense is not considered as the season is short

and as the fruits must be rushed to market as soon as they ripen.

During the balance of the year the trucks are employed at other work about the place, hauling in supplies of fertilizer, spraying the orchards, etc.

James McLane, Attleboro Falls, Mass., purchased his truck for hauling ice from an ice house on his farm to a market five miles away. He finds that his greatest saving in time is going and coming from town. Two assistants on the truck quickly dispose of the load, allowing the truck to return to the house for a second load.

Three loads are delivered three days a week, while the truck is used for farm work the remaining three days.

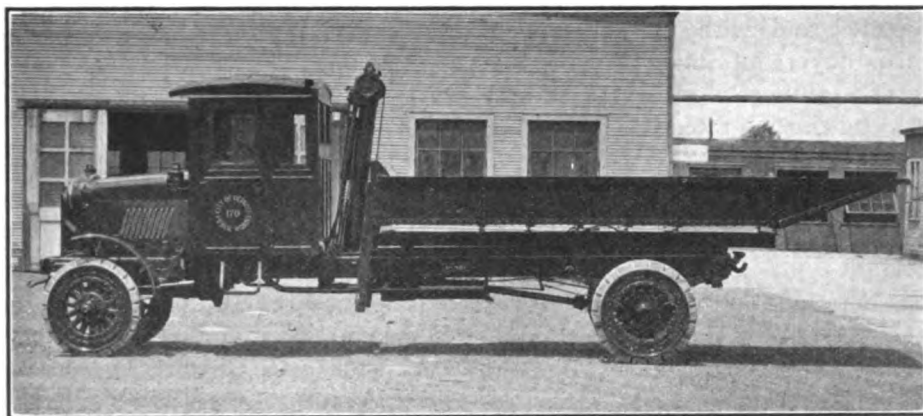
In the winter months, when the truck is idle, it is used for filling the house in conjunction with a device which Mr. McLane has made, thus losing no time, which is quite necessary as the freezing season is short and the danger of not getting ice of sufficient thickness is great. **Farmers Find Many Uses for Motor Trucks.**

"Del" Jencks, South Attleboro, Mass., finds that his 2½ ton truck works fine for delivering cord wood to a local wood dealer on a yearly contract. His wood lot is located about nine miles from town and the wood is hauled over a fine hard road which is in good condition at all seasons of the year.

The wood is hauled out of the woods by horses and piled near the road in spare time, the truck being loaded on fairly good ground and driven over the good road to the wood yard. He finds that this is a paying side line with his regular farm work as the wood can be hauled at seasons of the year when it does not interfere with his regular work. From two to three trips are made daily, allowing Mr. Jencks to keep ahead of his contract. Formerly this work was performed by horses and one trip a day was considered limit of endurance for horses.

Wants No More Rail Shipments.

Fred Field, Brockton, Mass., breeder of pure-bred Holstein stock, exhibits all over New England into New York state dur-



Heavy Duty Truck with Special Body Designed to Haul Garbage from City to Farm. Clean Dumping Is Possible with This Arrangement.

ing the fall at the annual fairs. To take this stock over the road in the quickest time from fair to fair and have it arrive on time, he uses two 3½ ton trucks fitted with stock sides and stanchions. He finds that his stock arrives in better shape and is able to clean up on prizes when compared with stock shipped by railroad. The cost of transporting the stock is slightly more than by rail but the condition of the stock is better and the period of shipping is greatly lessened. Asked if he would return to the old method of shipping by rail, he emphatically stated that he would not, having had all of the experience that he wanted of shipping by that method.

Operates Grain Business.

Horace Howard, Abbott's Run, R. I., operates a grain business in connection with farming operations. This calls for the delivery of grain over an area having a radius of seven or eight miles from the mill, furnishing feed direct to farmers. Two delivery trucks are used, a one ton and a 3½ ton truck. For many years Mr. Howard delivered this grain with horses, putting in long hours, often starting work before daylight and ending long after dark.

By using motor trucks he is now able to handle twice the business he did with horses and his trucks are back at the mill soon after six o'clock, the day's work starting at eight in the morning.

No definite figures are kept of operating costs, but the owner states that his trucks are returning him good interest on his investment as well as considerable time saved which he is able to use to advantage on his farm.

F. W. Hopkins, Seekonk, Mass., uses his truck for delivering hay to customers in the city and finds that it performs this work much faster and easier than with horses, enabling him to use the time saved in farming operations. Other lines of work keep the truck busy about the farm when not hauling hay, so that he receives good returns on his investment.

Hauling Burned Lime to Customers.

Herbert Harris, Cumberland, R. I., uses two trucks equipped with trailers for delivering burned limestone to hardware, lumber, and coal dealers in nearby towns and cities. His farm is located in a limestone section and the making of burned lime is a side issue for him. This product is used in many ways in the building industry and also for treating sour or acid farm lands, so that he is able to keep his two trucks busy most of the season.

One load a day was the limit of his former horse delivery system and it was necessary to ship large quantities by rail. By use of motor trucks he is able to deliver the lime, which is barreled, to cities 30 miles or more distant from the lime kiln. Operating costs are not figured accurately, but Mr. Harris states that the cost of delivery is low compared with horse delivery as the life of a horse was short in the former method of delivery and a large amount of time was necessarily consumed in reaching the customer and returning.

Trucks Increase Business.

The saving in time also allows a larger amount of business to be

handled and with the increase of farm buyers of lime, this necessitates additional work which he now has the time to attend to.

Operates Cider Mill.

Charles Carpenter, Adamsdale, Mass., operates a cider mill as a side issue to his farming, making for custom trade or buying the apples and selling the cider to customers in a city several miles from the farm. Rush orders are often received over the telephone during the fall and early winter months for this product and a truck is pressed into service to deliver it.

Several trips are often made daily for a barrel, or less, which if a horse and wagon were used, would consume a vast amount of time and also cut down the number of deliveries it would be possible to make. He states that the truck is a paying investment for him in this one line of farming alone, but that he finds constant use for the truck in other lines of farm work as well, such as hauling wood, supplies for the farm, etc.

Many other instances could be cited where farmers are making use of the motor truck to good advantage in their farming operations both in regular work and side line, which all goes to show that while the farmer was probably a trifle late in making use of the modern power vehicle, he finally has got going, and is making use of it in every way possible to save himself and his family so that they may get more out of life than formerly, thus removing some of the drudgery from farm work and making farm life more pleasant.

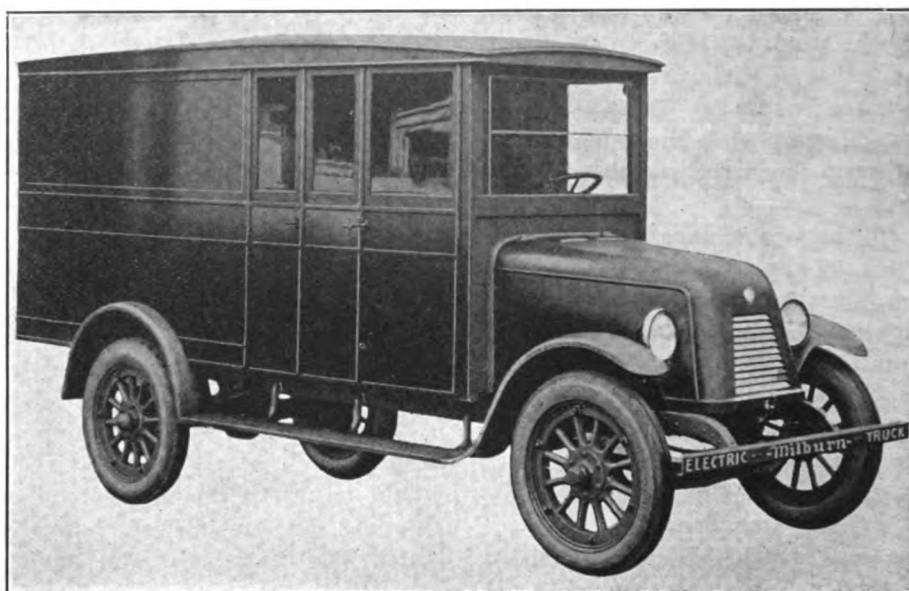
The reason seems to be the same in nearly every instance of farm owned trucks: investment, ease of doing work, and the shortening of the number of hours to do a certain task. The farmer is willing to be shown and after he is convinced, he will buy what he deems best for his own particular needs.

Raymond W. Dunster is no longer chief truck draftsman for the Vulcan Manufacturing Company, Seattle, Washington, but is now draftsman in charge of standards and shop orders for the Boeing Airplane Company, also of Seattle.

Millburn Wagon Company Adds Two Units

THE Milburn Wagon Company, Toledo, O., manufacturer of electric passenger cars and trucks, announce the addition of two new truck units to their line, which formerly consisted of a brougham, a coupe, a roadster and a 750-pound delivery truck.

It is said the Milburn electric trucks incorporate many radical changes in design. New and improved features, many of which are exclusive, have been added with the direct purpose of making these trucks particularly suitable, because of their increased reliability and economy, to the continuous grind of hard commercial service required in business deliveries.



This Milburn Truck Is Said to Incorporate Many Radical Changes in Design.

INTEREST in the electric truck as a means of reducing delivery costs is increasing very rapidly among business men, who are coming to realize that the electric truck offers just as efficient a delivery unit as any other form of truck.

An analysis of electric truck users throughout the country reveals that bakeries, laundries, milk companies and department stores are adopting the electric truck because of its ability to operate on schedule in all weathers. Delivery costs have in many instances been cut 25 per cent. to 50 per cent. over the horse and wagon.

In anticipation of this demand for economical delivery, which farsighted business men are looking for, a demand which is already making itself felt among manufacturers of electric trucks, the Milburn Wagon Company has concluded a period of very severe tests under actual driving conditions and now of-

fers to the market both a half ton and one-ton truck especially adapted to frequent stop service of city business deliveries. The company is receiving many daily inquiries concerning these trucks, as a result of which considerable business is expected.

TRACTOR USED FOR ECONOMICAL SEEDING.

The development of power farming equipment still goes on. One of the latest devices is a seeding attachment which can be connected directly to a spiked-tooth harrow, thus making a superior combination for seeding and covering of grasses and legumes at one operation. Attachment is made in various lengths so as to fit two, three or four section harrows and can be used equally effectively with any one. The power for operating the seed-hole agitator is derived from two wheels, one at each end of the machine. The whole machine is built close to the ground to prevent scattering of the seed by the wind.

This machine has met with the approval of all who have seen it, it is stated.

Republic Service Policy Embraces Much Wider Scope

Plan in Process of Development for Several Months
Now Functioning in Various Localities Served by
Company, States Col. Frank E. Smith.

AN important reform in the service to owners of motor trucks is announced by the Republic Truck Sales Corporation, Alma, Mich. It is a plan which Colonel Frank E. Smith, the Vice President and General Manager of the Republic Company has been developing for the last two months. Its outline has been of the deepest interest to the trade.

MAKING a forward step in the much needed improvement in keeping motor trucks constantly on the job after their purchase, the Republic Truck Sales Corporation has adopted as its slogan "Republic Unequalled Service."

This new policy as outlined by the Republic Company is briefly: First: The development of the service department at the factory to permit a 24-hour service to branches, distributors and associate dealers.

Second: The entire re-organization of the service which has heretofore been extended to owners in their localities. The public's interest, of course, is in that amount of service which attends the truck after it has been put into owner service.

Plan Enthusiastically Received.

Under Colonel Smith's new plan which has elicited the most enthusiastic commendation from the Republic truck merchants, the factory's interest and the distributor's and dealer's interest in the truck sold, so will guard the truck that the owner may depend on its daily performance to the end of its career.

The plan includes supplying all distributors, branches and dealers with a stock of parts, based on the maximum requirements that might

be expected from all the Republic trucks sold and in use in their territories.

Service trucks are to be maintained at these Republic establishments—the ambulances of the motor truck business. Accidents will happen in the best regulated of truck families. Machines will collide at street corners. Repairs, too long neglected, may develop serious trouble just when the truck-owning firm is making a special effort to give quick delivery to its customers. And the merit of truck use is speed with continuous operation.

Complete Service Facilities.

Under the new Republic plan, in its perfected form, if breakdown oc-

curs, the driver of a Republic truck has but to telephone to the Republic service station. The service man at the other end of the line, immediately has the service-machine loaded with the parts required and in a few minutes relief is on its way to the stricken truck.

Skilled mechanics accompany the service wagon. The repair will be quickly made; the loaded truck sent on its way and all possible traffic congestion in city streets relieved. In necessary cases, Republic trucks are loaned to the owners to temporarily fill the gap while their equipment is being repaired—thus carrying out the famous Republic Slogan: "Unequalled Service and Uninterrupted Performance."

An entire building has been set aside at Alma, Mich., for this new department which is now in charge of Gordon Cameron, widely known in the automotive world.

Service Building Scientifically Planned.

This service building has been laid out on scientific lines. The bins and their arrangement are a model of efficiency. Here are stocked parts for all Republic models under a new system which makes it as "orderly as the words in a dictionary." Every modern appliance and convenience for the quick packing and shipping of parts have been provided. To complete "Republic Unequalled Service," every order reaching the factory for repair parts, will be shipped the day of its receipt.

"The Republic Company," says Colonel Frank E. Smith in explaining these great improvements in truck-service, "intends to give Republic users the highest possible degree of service."

"REPUBLIC UNEQUALED SERVICE"—WHAT IT DOES:

1. Keeps truck on job after purchase.
2. Permits 24-hour service to branches, distributors and dealers.
3. Reorganizes service extension to owners in different localities.
4. Facilitates prompt answering of application for service.
5. Allows owner to place more dependence in daily performance of truck.
6. Allows carrying of ample stock of parts by distributors.
7. Makes provision for maintaining service trucks at each establishment.
8. Makes loan of replacement truck if necessary.

TRUCK TALK

REMEMBER GULLIVER.

LEGISLATION that makes conditions easier for the railroads at the expense of the public has no place in American politics, though paradoxically it apparently has a well defined and substantial standing at the present time. One might yield to the temptation to subject the foregoing to a complete analysis that would show just why politics should not be allowed to enter into the transportation problem, but since the reason must be fairly obvious, no necessity exists for such an explanation.

There is no doubt but that the railroads were the first satisfactory large-scale method of transportation, and as such did more to build the United States to its present place as the greatest nation in the world, than any other one factor. But that was yesterday—today's picture shows a different vista.

The "transmutation of old years into new days" is a process that is necessarily slow, and the man or method willing to change with the changing cycle has little difficulty in keeping pace with the transition. Nor would the railroads, did they even so much as evince a willingness to take into account the great change in short haul transportation that came about with the advent of the motor truck, but for some reason not clearly defined they seem not to have realized this important fact—either that, or they feel that their strength is such that they can dictate to the rest of the country.

But since a chain is only as strong as its weakest link, so the railroads, great though they are, and possessed of influence that transcends mere wealth, cannot continue to dictate the way and method of short-haul transportation. A competitor, small in unit, but mammoth in the strength of its numbers has come upon the scene and in the short space of a few years has shown the railroads that regardless of legislative influence, they cannot continue to name the terms of this class of business.

The railroads played havoc with the short-haul shipper for years. They fixed freight rates for short hauls at a point that was suicidal to the small business man, and, what was even worse, handled these shipments in what appears to have been a shiftless and apathetic manner. And, to

add insult to injury, the agents of these railroads, apparently working under orders, in a more or less subtle manner made it known that the railroads did not want this short haul business—that it did not pay them, that they would be able to make some money if it was not for the expense of moving this class of freight—in a word, their attitude plainly showed that they considered that they were doing the public a favor by even condescending to handle the short haul freight.

And then the highly efficient and dependable motor trucks came along and took away the grievous short-haul burden from these railroads. What happened then. Within a year or so of the time the trucks coralled this short-haul business the railroads were clamoring for it again. They needed it if they were to pay dividends they said, and they went after it—but not in open competition apparently. Every fair-minded business man welcomes fair competition. It has rightly been called the life of trade. But the railroads don't seem to be willing to fight fair. Instead of trying through the medium of decreased rates and better service to win back that which they have lost, there is every reason to believe that they are seeking to get it back at the same old rate by legislative rulings that will tax the motor trucks to a point where they will have to raise their rates to a high level if they are to do business at a profit.

This method of fighting is un-American, and follows a path far divergent from the ideals on which the civil and social structure of this country is founded. That fact won't kill it however, as we are growing more tolerant of monarchical restraint such as the railroad would impose. The real factor that will defeat the purpose of these railroads is the fact that their plans are at variance with the best teachings of economics. It is for this reason that they eventually must bow to the transportation methods of the new day.

There is something ridiculous in the present picture. It reminds one of the story of the Fox and the Grapes, the Dog in the Manger and the tale of somnolent Gulliver who dreamed away the hours while the busy little men tied him hand and foot.

THE TAX QUESTION.

BUSINESS papers representative of the various industries are quite naturally favorable in their editorial comment with regard to the industry they may represent. This is but natural, and, so long as such comment is confined to honest statements of facts there should be no objection on the part of anyone.

Certain interests, however, have gone so far as to state that these trade journals as a whole were entirely prejudiced editorially in favor of the industries which they represent, regardless of where such prejudice might lead them, the specific charge being made that the automotive publications, in their anti-tax editorials, were going beyond the bounds of reason.

Obviously, such a charge, which in effect would indicate that these trade journals were dispensing mercenary propaganda, is ill-founded and wholly at variance with the true state of things. Certainly the editor of any publication, whether it be a class magazine or a daily newspaper, would not countenance any such prostitution of his charge, and the fair minded reader knows that this is so.

He also knows that there has been uncalled for and excessive taxes directed against those in the automotive industry and operators of motor vehicles as well. This is a known fact, and surely the editor of an automotive publication would be poorly fitted for his position did he not take steps to combat such an evil.

But, are the automotive journals the only publications that are fighting the issue? No. Many of the leading daily papers are lined up solidly on the side of the industry, and the following editorial is just one of many similar that prove the truth of the foregoing contentions; it isn't from a trade magazine either, but is reprinted from the Boston Evening Transcript of Saturday, March 18.

MOTORS, ROADS AND TAXES.

"It will be well to consider very carefully before enacting them all proposals for any considerable increase of taxation of motor vehicles, especially of commercial trucks, for the benefit of the road-building funds. Such proposals are easily made and are plausibly recommended. It is argued that as motor cars are the chief users of the highways they should be made to pay for the improved and expensive construction which they require; and that the heavy commercial trucks should be made to pay most, because they wear and damage the roads most. But there are some

other phases of the matter.

"Years ago, before the advent of motor cars, the highways were used by horse-drawn vehicles. But we do not remember that any special fees and taxes were levied upon them and their drivers, for the building and upkeep of the roads.

"Nor was that because such vehicles were content with unimproved roads which cost little; since it was in the days of horse-drawn vehicles that we began and proceeded far with the construction of macadam, telford and asphalt pavements, in city and country. The roads were paid for not exclusively by those who drove upon them, but by the whole community or State. There appears no convincing reason why there should be a discrimination against motor vehicles which was never practised against vehicles of any other kind.

"It is to be observed, moreover, that motor vehicles are already subjected to various taxes and charges, more than most or perhaps all other classes of property. These charges vary greatly, it is true, in various States; but, generally speaking, there are four separate charges against them. One is, of course, common taxation as personal property, a tax which it is difficult for them to evade. Men may conceal much personal property from the assessors, but the possession of an automobile cannot be concealed, and almost invariably marks the proprietor for the assessors' attention. Then there is the registration fee, which in some States is considerable, amounting to one or two per cent of the cars value, yearly; and graduated according to the size, weight or power of the car. Third, there is the personal license fee of the driver. Finally, there is the very heavy cost of insurance which, while not made compulsory by the Government, is imperatively required by all considerations of prudence. It would be difficult to find any other class of personal property which is levied against to so great an extent.

"As for the proposal to place specially heavy taxation upon commercial trucks, it should be borne in mind that those are the very cars which are of most benefit to the public at large. They have effected one of the most marked industrial and social revolutions of modern times, comparable with that effected by the railroads. They have created a new system of marketing, of incalculable value and practical profit to producers and consumers. They have increased the value of land and the potentialities of profit from its

(Continued on Page 220.)

LEGAL POINTS

By SAMUEL WANT

IN A case recently before the Supreme Court of Washington, the question at issue related to the division of a verdict for \$2200 between the widow and son of a man killed in an automobile accident. The widow was the deceased's second wife, whom he had married about 13 months before the accident. The son was the offspring of his first wife, and was crippled. He was a minor. In the lower court \$1600 had been allotted as the widow's portion, and the balance as the son's. This division was sustained by the higher court.

THE court points out that a crippled child is entitled to parental support after attaining his majority, and that this fact must have figured in the jury's assessment of the damages in the first instance. In an independent suit against the motorist, the son would have been entitled to damages on this basis. Therefore, in a suit in which his claim forms an element, he is entitled to an allowance corresponding to the measure of his independent rights.

A CALIFORNIA decision deals with the claim of a motorist that a verdict for fifteen hundred dollars in an accident case not involving death or permanent disability is excessive. The evidence showed that the plaintiff had been injured through the negligence of the driver of a bus in which he was riding at the time of a collision; that he received a cut about an inch deep in the hip, which required a closure of the wound with stitches; that his back was wrenched and strained; that his leg and arm were bruised, and that his body was rendered stiff and sore, and his nervous system shocked by reason of his experience; that at the time of the trial he was still suffering from this nervous shock which made him constantly apprehensive in the performance of his work of driving an automobile. He spent nine days in a hospital, and was confined to his bed at his home for two weeks additional. He was unable to resume his work for six weeks, and his clothing, including an overcoat and suit, were ruined. He also incurred hospital and doctor's bills.

Upon this state of facts the court held that the verdict was not excessive.

A NOTHER decision just rendered in California involves a marital tangle as well as an automobile.

A wife had an unpaid judgment for alimony. Her divorced husband had owned an automobile before the divorce. At the time of the present suit he was living in an apparent illicit relation with the co-respondent named in the divorce case, and he had transferred the car to her for a sum representing its supposed value. At least that was his claim, and also the claim of the women in the case. But the two used the car without limitation as to ownership. Irrespective of the question whether the sale of the car had been genuine, the court decided that the wife's alimony claim was enforceable against the car, because there had been no actual change of possession. Such a change is essential to transfer ownership, unless the transfer is recorded on the public records as in the case of a sale of real estate.

This decision has a wide and practical application in the matter of automobile purchases. If a man buys a car and, for some reason, the transfer of possession to his is delayed, he runs the risk that a creditor of the seller may step in and enforce his claim against the machine, treating it as the seller's property. A recorded bill of sale obviates the risk.

MUTUAL NEGLIGENCE on the part of two motorists, resulting in a collision, bars each party from collecting damages from the other. The courts will not weigh the question whether the negligence of one was greater than that of another. This is immaterial. This rule was recently applied in Oklahoma to a case in which it appeared that a collision occurred between cars approaching from opposite directions. Both cars were very close to the center of the road. This fact, the court held, justified the jury in denying the claim of one and the counterclaim of the other.

IN A recent South Carolina case a boy 11 years old was killed when he tried to mount the truck of his employer to go part of the way in delivering a message for his employer. The accident was due to the premature starting of the truck. While the boy had not received instructions or authority to go on the truck, the employer knew that boys in his employ habitually go on the truck when it was going their way. There was some testimony that the boy had been specially warned that he must not ride on the truck. Upon this state of facts, the court held that the employer was responsible in damages for the boy's death.

THE EVIDENCE in a recent Florida case showed that the last note due under an instalment contract for

the sale of an automobile was not paid on the due date. On the following day the account was placed in the hands of an attorney with instructions to reclaim the car. The contract provided for the payment of an attorney's fee if the note was not paid at maturity and was placed in the hands of an attorney. On the same day that the attorney received the claim, the seller received the debtor's check in payment of the note. It was not certified. The seller refused to accept the check, demanding that the attorney's fee be paid also. This the purchaser refused to pay, but offered no explanation for his delay of one day in making the remittance. While the default was thus one of purely nominal duration, the court held that the contract requirement was enforceable, so that the debtor either had to pay the attorney's fee or surrender the car.

J. S. B., Idaho Falls, quotes:

Answering your query: A recent decision of the Supreme Court of California, which gives a repairman a lien superior to that of a chattel mortgage of prior date is, — Mortgage Securities Co. of Cal. vs. Pfaffmann, 177 Cal. 109, 169 Pac. Rep. 1033. This decision was followed recently in Krantzner vs Faulkner, 185 Pac. Rep. (Cal. App.) 305:

"L. S., 1028 Twelfth St., Detroit, Mich.— Your letter lacks important details. Did the accident occur at night? Presumptively, it did. If so, did your car have the required lights in front and the regulation rear light? and did the electric car have a light sufficiently bright to enable the motorman to see a reasonable distance ahead if he was properly attending to his duties? Regardless of whether the occasion was at night, it is significant that only twenty paces intervened between your crossing point and the stopping place of the car. Within that short space, did the electric car attain such a speed that when you discovered the danger there was not time or space to stop. Various possibilities suggest themselves. Presumably, negligence will be denied on both sides, and an opinion that could help you must be based upon a full statement of the conditions implied in the above queries. The editor is at your service if you will fill in the gaps.

A RECENT enactment of the Massachusetts Legislature denies the use of the public highways to motor vehicles with an outside width in excess of 96 inches. Another statute limits the length of the vehicle, including the load, but exclusive of trailers, to 28 feet, but provides that the local authorities may, in particular cases, authorize an increased length of vehicle and load

under proper restrictions. This exception, presumably, covers the transportation of such exceptional material as girders for construction purposes, theatrical equipment, machinery, etc.

A New York statute just approved prohibits the driving of a motor truck or trailer on highways outside of cities where the width of the body, inclusive of load, is more than eight feet, or where the height from the pavement to the top of the vehicle or load is more than 12ft. 6in.; this statute further provides that, where the combined weight is more than 25,000 pounds, the load must be so distributed that there shall not be more than 800 pounds an inch in width on any one wheel.

ANOTHER recent statute of Massachusetts prohibits the operation of any taxicab, commercial vehicle or motor truck so constructed, equipped or loaded that the driver has not an unobstructed view of the highway in the rear, unless it carries a mirror or reflector so placed as to afford the operator a clear view of the highway in the rear.

A RECENT Washington decision emphasizes the futility of making misrepresentations for the purpose of obtaining lower insurance rates upon automobiles. The purchaser of a second-hand car, a 1910 model for which he had paid \$2000, stated in his application for fire insurance that the car was new, a 1911 model, and that he had paid \$3400 for it. The insurance rates on a 1910 model are much higher than those on a 1911 model. The car was destroyed by fire, and, when a claim was filed under the policy, the insurance company refused to pay the loss, contending that the misrepresentations upon which the policy had been obtained rendered it void.

The owner of the car admitted his misstatements, but claimed that he was entitled to the amount of the insurance less the difference in the amount of premiums representing the increased rates for a 1910 model. In the lower court, the owner obtained a verdict, but this was reversed by the Supreme Court. This court applied the well-settled principle of law that intentional misstatements of fact, which result in obtaining a lower rate of insurance render the policy absolutely void. Not even the premiums paid can be recovered in such a case.

IN A RECENT New York case it appeared that a hospital furnished ambulance service for the State under a yearly contract. Through negligence of the driver of one of the ambulances engaged in this service, a pedestrian was injured. He could not recover damages against the State, although the ambulance was in use for its benefit, because the State is not subject to suit without its consent. He, therefore, sued the hospital, which was the owner of the ambulance and the employer of the driver. The hospital contended that it was entitled to the State's immunity from suit when engaged in the service of the State,

just as any branch of the State government would be. The court of appeals of New York did not accept this view, however, and held that the hospital was responsible for the consequences of its driver's negligence.

WORKMEN'S compensation laws, providing for the compulsory payment of a fixed scale of compensation for injuries received or for deaths incurred in industries involving risks or hazard, apply in most States to automobile and truck drivers, but are limited to accidents which occur when the workman is engaged in the performance of his duties. In a recent Ohio case, one of the drivers of a taxicab company reported for work in an intoxicated condition. He was ordered to go home. He started away, but returned to go into the garage lavatory. On his way there he fell down an open elevator shaft. It was decided that this case did not come within the benefits of the workmen's compensation law.

IN PRECEDING ARTICLES in this series attention has been called to a number of cases holding garage owners responsible for cars which were stolen from their premises. A parallel line of decisions deals with the liability of a garage owner where he delivers a patron's car to the wrong person, either as a result of negligence or through an innocent mistake due to the fraud of the person who gets possession of the car. In a recent Delaware case, the court applied the rule, already well settled, that, under either of the conditions mentioned, the garage owner is responsible for a patron's car delivered to the wrong person and thereby lost to the owner.

A TRUCK driver is not guilty of negligence, so as to render his employer liable for an ensuing accident to a pedestrian, because of his failure to blow his horn and reduce his speed when he saw a pedestrian directly ahead of him on the road, where he was led to believe that the pedestrian was aware of the proximity of the truck and was proceeding to get out of its path. It was so held in a recent Missouri case, the facts of which show that the pedestrian suddenly became frightened and confused and was run down before the driver was able to discern the danger.

IN A RECENT New York case it was held that where an automobile ran into the rear of a wagon on a dark night, there being no lights in the rear of the wagon as required by law, proof of this fact alone is sufficient to absolve the motorist from liability for the damages resulting from the accident, without the necessity of proof on the part of the motorist that he was exercising due care and complying with all legal requirements on his own part at the time of the accident.

IN A recent Ohio case the evidence showed that a wholesale house kept an automobile for the use of its salesman. The car was used on the occasion in question by the bookkeeper and

cashier, and through their negligence a pedestrian was injured. There was no evidence to show that the parties referred to had any right to use the car, or that they were using it in the prosecution of their employer's business at the time of the accident. The court held that the owner of the car was not responsible for the accident.

THE new edition of Huddy on Automobiles, recently published, collates the latest decisions construing automobile insurance policies covering "collisions." It is found that these policies are held to cover collisions with either a moving or a stationary body. In act, the expression, "collision with" as used in a policy may be deemed equivalent to "striking against." And the stationary body with which the car finally comes in contact may be either land or water. Thus a loss resulting where a car was precipitated over a bridge into the water below and was damaged solely by the immersion was decided to be covered by a policy covering "collision." But in a case where the injury was caused by turning in a ditch at the side of the road when passing another vehicle, causing one of the wheels to collapse, it was decided that the loss was not covered by the policy.

Most policies providing for accidents due to "collision" contain a specific provision that they shall not cover damages caused "by striking any part of the roadbed." It has been decided that the curbing of a street is a part of the roadbed within such an exception, and hence that damage caused by colliding therewith is not covered by the policy. On the other hand, the guttering along a highway is not within the exception in question.

IN A recent case an automobile standing in a garage was damaged by the second floor of the garage falling on it. It was decided that this accident did not come within a policy protecting the owner against damages arising from "collision."

A RECENT decision of the Court of Appeals to the District of Columbia points a warning about the protection of insurance where a lien is given on a car. Most policies provide that the insurer must be notified if a lien is placed upon the car, and that the policy shall be absolutely void if this notice is not given. In the case in question this provision of a policy was enforced, so that the owner of a car sustained a total loss on a claim that otherwise came squarely within the terms of his policy.

Niles G. Bergenholtz, until recently designer for the Day-Elder Corporation, Newark, N. J., has accepted a similar position with the Westinghouse Electric & Manufacturing Company, Springfield, Mass.

H. C. Aumet has become associated with the Detroit Cadillac Motor Car Company, 1881 Broadway, New York City. He was formerly manager of the parts department of the Locomobile Company, Bridgeport, Conn.

DESIGNED FOR BARREL HAULAGE



Two Hundred and Sixty Barrels Make Up the Load of This Mammoth Truck.

THE J. D. Hollingshead Company, Louisville, Ky., lays claim to having the "World's Championship Truck" at least for

size. This company offers shippers the services of package experts in working out efficient packing methods. The work of its trained men

in the crating and packing industry is very similar to the service in the transportation field offered by the Transportation Engineers of the Packard Motor Car Company.

Naturally, when one of Packard's transportation experts offered to help the officials of the Hollingshead Company solve their transportation problem, he was received with utmost cordiality, the Hollingshead people being thoroughly in sympathy with this method of doing business.

The solution of the problem was not so simple. Many light but bulky barrels had to be hauled, and there were any number of difficulties to be overcome. A very careful analysis proved that the truck and body shown in the illustration was the most efficient unit the company could use in its hauling work. The body holds 260 barrels, weighing 20 pounds each, making a combined load weight of 4200 pounds.

THE CUT-OUT

By H. M. H.

Let's get started to start something.

* * *

Give your service with a smile and give a smile with your service.

* * *

Willingness is essential in getting ahead, but it must be intelligent.

* * *

If you get discouraged because some customers are the limit, what will you do when you meet the ones who are limitless. Never get discouraged.

* * *

It is not how much work you can accumulate, nor how much you can eliminate—it is how much work you can assimilate that counts.

* * *

Never be "in" with anyone if you do not want to be on the "outs" with them.

* * *

Before you go to the boss and ask for advice, try to solve the problem yourself. If you succeed, the boss will appreciate it and you will gain by it.

* * *

Good mechanics are like diamonds, but, like diamonds, they are hard to find.

* * *

Don't confuse the courage of your conviction with stubbornness, as a stubborn department head is detrimental to any service station.

* * *

The point upon which the scales of sales and service will ever balance properly is team work.

* * *

If you show enough interest in your customer and his problems he will show enough interest in you to bring his car to your service station. Interest begets interest.

* * *

You want the formula for good luck Sure! Here it is: Hard work intelligently applied.

—A. S. A. Bulletin.

DIXIE MAN TO BUILD TIRE PLANT AT MIAMI.

Negotiations for the erection of a \$25,000 rubber plant at Miami, Fla., are now under way according to L. C. Cadenhead, president of the Memphis Industrial Exchange and also of the Dixie Rubber Company, Memphis, Tenn., of which the proposed factory will be a branch. Upon his recent arrival in Miami shortly after Christmas Mr. Cadenhead went thoroughly into the project with Walter R. Comfort, who is associated with him in the tire business.

No definite location for the plant has been selected as yet. The output of the proposed factory will be about 500 tires and 500 tubes per day.

Lieut. Ralph M. Parsons, supervising instructor of the Aviation Mechanics School at the Naval Training Station, Great Lakes, Ill., has been transferred to the Naval Air Station, Anacostia, D. C.

Walter M. Lipps, previously assistant manager of Reed & Glaser, Indianapolis, has recently accepted a position as engineer for the Meteor Motor Car Company, Piqua, Ohio.

Edward A. Rapin has accepted a position as engine layout draftsman for the Lawrance Aero Engine Corporation, New York City.

Rufus B. Jones is now associated with the Trailmobile Company, Cincinnati, having been previously chief draftsman in the axle division of the Standard Parts Company, Cleveland.

GRAMM-BERNSTEIN PIONEER

SIMPLICITY and accessibility of design are apparent throughout in the new Gramm-Bernstein Pioneer 1-ton Speed Truck, which should contribute greatly to easy and prompt adjustment. An all-copper and brass radiator, protected by a staunch cast semi-steel shell mounted on the frame with springs, is used instead of the conventional terne plate or galvanized radiator, rigidly mounted.

THE power plant is a high-speed engine with removable head, hot-spot manifold and stove on exhaust pipe for triple heating fuel, and the manufacturers claim unusual efficiency and economy, having obtained an average of over 15 miles to the gallon of gasoline under full load, it is said. One interesting feature of the engine is a construction which permits the valve tappet guides and tappets to be easily removed en bloc. The engine suspension is semi-flexible, three-point to main frame,

tions of high speed shaft.

The propellor shaft is tubular, and the usual Gramm-Bernstein flexible oilless disk joints are used at both ends. The rear axle is three-quarter floating, bevel type, gears being of helical spiral design, accurately cut and mounted on large annular bearings. The housing is pressed steel with heavy drawn steel tubes and is further strengthened by a well anchored truss rod underneath. The complete differential and carrier is easily removable as a unit after drawing the drive bar by simply unbolting from housing. Drive bars are ample size, of chrome nickel steel, the wheel bearings being extra large double row annular.

Uses Laminated Wood Wheels.

One especially interesting feature of the new Gramm-Bernstein Pioneer is the airplane type laminated wood disc wheels, nine ply front and eleven ply rear, which the manufacturers claim not only add to the appearance of the truck but also to the life of the tires. It is

usual practice, the front end spring hanger is a separate casting, this also providing for lamp and fender supports and anchorage for the bumper, which is channel steel.

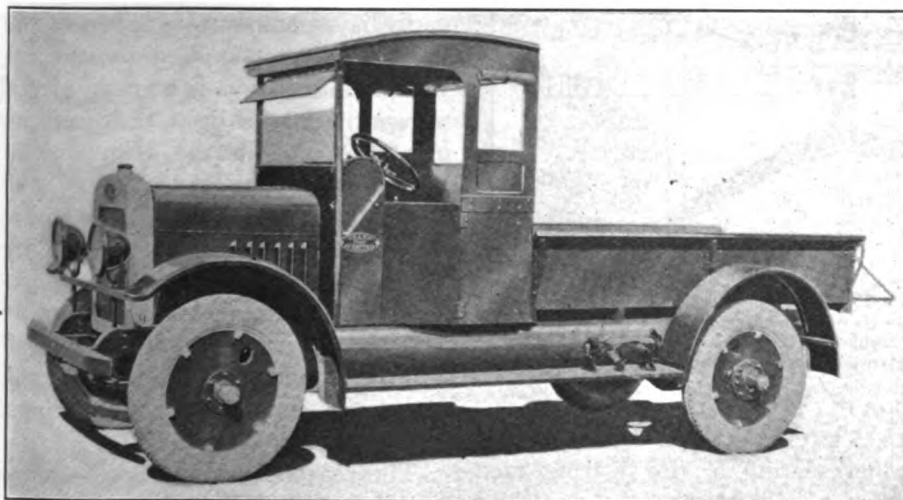
The service brake is 16 by 2 in. on the rear wheels with a simple and positive cable and pulley equalizer. The emergency brake is a contracting band on the propeller shaft.

Connecticut ignition is used, with an automatic circuit breaker to prevent battery exhaustion; water circulation is thermosyphon, the large radiator insuring ample cooling; lubrication, combination force feed and splash; gasoline supply, 16½ gal. tank mounted in the dash, insuring strong gravity feed.

Springs are designed to carry flat under rated load and are fitted in each hanger with graphite impregnated oilless bronze bushings, requiring no further lubrication. The chassis is equipped with 35 by five inch tires front and rear, electric lights and starter, speedometer, compression whistle, front and rear fenders, with running-boards and dust shields, bumper, jack, pump and full set of tools, front and rear license brackets, spare rim, etc., and the truck is listed in 16 combinations of bodies and equipment. Painting is included.

Gramm-Bernstein Specifications.

Price	\$1,365
Wheel base, in.....	128
Tires, front.....	5
Tires, rear	5
Bore, in.	3½
Stroke, in.....	5
S. A. E. hp.....	19.6
Speed, r. p. m.....	2,400
Speed, m. p. h.....	45
Gear ratio in high gear.....	5.75 to 1
Final drive.....	Spiral Bevel



Simplicity of Design Is a Feature of This One-Ton Delivery Job.

with large trunnioned support at front end.

A 10-in. ten spline shaft dry-plate clutch is used, enclosed in unit with the engine. Transmission is sliding gear type, three speeds forward and reverse, with nickel steel shaft and ample gear faces, shafts being mounted in double row annular ball bearings with additional roller bearings at the junction of the two sec-

claimed that sets of these wheels which have been run over 40,000 miles have shown no signs of warp or wear.

Extra Long Springs.

Gramm-Bernstein calls particular attention to the springs and frame of the truck, the former being of extra length and the latter a straight section pressed steel channel construction. Following its us-

T. P. Chase, chief engineer of the Lalley Light Corporation, Detroit, has severed his connection with that company to become automotive engineer for the General Motors Research Corporation, Dayton, Ohio.

George J. Dietz, Jr., who was formerly connected with the Ford Motor Company, Dearborn, Mich., has become service engineer for the Lincoln Motor Company, Detroit.

Ernest V. Pannell has been made superintendent of power and maintenance for the Burroughs Adding Machine Company, Detroit.

Bearing Composition and Renewal

Detailing Proper Overhaul of These Important Units
From a Practical Standpoint—Also Describing Types
of Jigs and Fixtures Which Aid Precise Alignment.

WHENEVER one part of a mechanical device moves or turns on another part, friction is an incontrovertible result. The friction generated causes loss of energy, in a great measure depending on the materials of which the bearing is composed and the total area of the contacting surfaces.

The elimination of the loss of energy to the lowest

extent possible has been one of the tasks of the modern engineer. The engineers rapid progress in the study of metallurgy and its chemistry, combined with the extensive field for experimenting afforded by the automobile, have placed the roller, the ball and the plain bearing in the exalted position of perfection and distinction they now occupy.

Ball and roller bearings are practically ideal for many locations in the automobile. They are manufactured from a good grade of tool steel, hardened and ground to very accurate dimensions, which allows the renewal of a bearing without ma-

seat should be wiped clean of all dirt and a coating of lubricating oil applied to the outside of the bearing race. The average motorist or mechanic does not realize the damage that can be done by a small chip of metal or dirt, if the bearing is seated

driving in of a bearing with a driving rod smaller in diameter than the outer race of the bearing. In this case the rollers or balls must withstand the impact caused by the blows of the maul in forcing the race into position. There is danger of cracking the balls or race when this method is used, as the bearings are made to a flintlike hardness.

Each type of bearing has points that excel when subjected to different operating conditions. The roller and ball type of bearing is preferred for transmitting the power from the engine to the driving wheels because it consumes very little of the kinetic energy supplied by the engine. The ball type is usually placed where the load is light and uniform. At any point in the transmission system where the load is heavy, and end thrust encountered, the roller type is chosen because of its ability to successfully meet these requirements. The question naturally arises, why isn't the roller and ball type of bearing used in the crank shaft and connecting rod bearings, since it is so nearly ideal?

The reasons prompting the automobile engineers to use the plain bearing in these positions may be directly attributed to the hardness and corresponding brittleness of the roller and ball type, the lack of bearing surface to absorb the shock of the explosion and distribute it to a wide area on the crankshaft, the difficulty to install and disassemble, and the marked probability of extensive damage being done by the breaking of a ball, roller or a race.

The plain bearing is beyond ques-

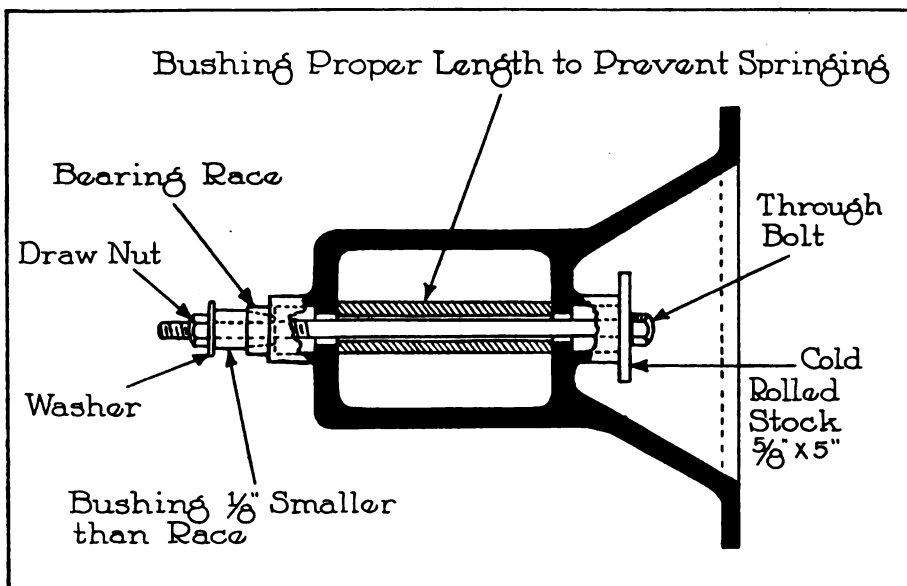


Fig. 1—Light and Fragile Castings Must Be Braced to Prevent Breaking or Springing When Bearing Race Is Being Drawn Properly to Seating Position.

chining any of the parts, the alignments being adequately cared for when the bearing is manufactured.

Precautions are necessary however when installing these bearings as irretrievable damage may be done to the receptive casting by springing or cracking it. Figure (1) illustrates a typical method of drawing home a roller bearing race and also shows how the casting should be braced. Before drawing the replacement bearing home a three cornered scraper should be used to remove all burrs from the edge of the casting hole. The surface of the bearing

upon it. This dirt can throw the entire shaft alignment out, prevent proper seating of the bearing race and make necessary the removal of the bearing.

Sometimes it is necessary to drive the bearings into position by using a hammer or a copper maul, as means are not available to press them in. The person installing the bearing must exercise great care not to allow a canted start (Fig. 2) when driving the bearing into position, as this will cause shearing of the metal which is to retain the bearing race. Another poor practice is the

tion of a doubt the type requiring the most attention as every repair man well knows. The work of adjusting and repairing this type must be done in an intelligent and careful manner. It is not enough to scrape in a bearing nicely. The scraping-in must be done in such a way that all the component parts of the machine will be in the same accord with each other, as when the machine was new.

This condition cannot be achieved if haphazard methods are used when adjusting or aligning a bearing. It is well to bear the fact in mind, that a change of the adjustment of one part of a unit invariably tends to create a different action in another part or parts. For this reason the motorist or the mechanic before making any adjustment should ask himself the question, "What tendency will this adjustment I am about to make have on the preceding operation, or the subsequent operation, of the unit?" In other words, will the adjustment disturb other adjustments so that the unit will not function properly.

Plain Bearing Alloys.

The common type of plain bearing has an alloy shell composed of copper, tin, lead and zinc. Different manufacturers use these metals in various proportions and their product is known by the firm's own trade name. These products are all rightly claimed to be adapted for particular classes of work.

The reason alloys are used as bearings in place of wrought iron, cast iron or steel, is because wear and friction has been found to be more rapid when two metals of the same kind work together. Therefore, it is more desirable to use a soft metal which will take the wear and can be renewed easily, rather than a hard metal which will wear the journal more rapidly. Then, too, the soft metals are more easily worked to the proper shape.

A good bearing composition must have several basic characteristics. It must be strong enough to carry the load without distortion, as the pressure per square inch on the bearings frequently runs into hundreds of pounds. The bearing metal must

not heat readily. This was a serious defect in the old copper-tin bearing which was made of seven parts copper, to one part tin. Though possessing certain good features this metal was found more apt to heat than many other alloys. In general, research seems to show that the harder the bearing metal, the more likely it is to heat. It is also desirable to have the bearing metal work well in the foundry as oxidization while melting causes spongy castings, although in great degree this can be prevented by a liberal use of powdered charcoal during the melting.

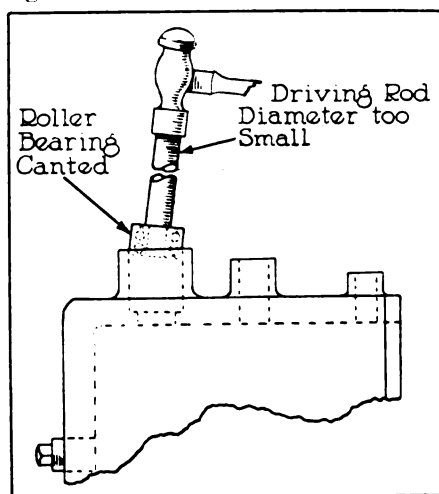


Fig. 2—Bearings Can Be Ruined by the Use of Improper Method of Driving.

The principal element of value in the phosphor-bronze bearing commonly used today, is the addition of one to two per cent. of zinc, or a small amount of phosphorus to a bronze base, the combination making a sound casting as a rule.

One of the leading characteristics that the bearing metal must possess is ability to cause minimum amount of friction. It is true that friction is almost wholly a question of the

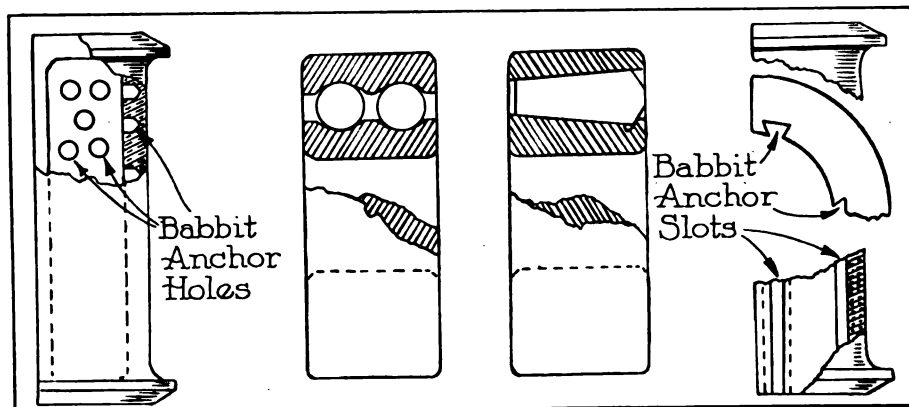
lubricant used; but the metal of the bearing has certainly some influence. All other points being equal, good bearing metal may be chosen for its long wearing quality.

The phosphor-bronze metal has proved its superiority to the old copper-tin alloy of seven to one, in many extensive tests. By experiments it has been found that arsenic may be substituted for the phosphorus in a copper-tin alloy with good results. As the proportion to lead is increased to correspond with the standard, the durability also increases. The influence of lead on this copper-tin alloy seems to be much the same as a still further diminution of tin. However, the tendency of the metal to yield under pressure increases as the amount of tin diminishes, and the amount of lead increased, therefore a limit is set for the use of lead.

Bearing Lining Metal.

The plain bearings of the automobile engine are usually lined with a composition known as babbitt. This is composed of tin, copper, lead and antimony. Among all the soft metals in use there are none that possess greater anti-friction properties than pure lead; but lead alone is impractical, for it is so soft that it cannot be retained in the recesses. But when by any process lead can be sufficiently hardened to be retained in the boxes without materially injuring its anti-friction properties, there is no metal that will wear better in light, fast running journals. Lead is the basis of the majority of the best and most popular anti-friction or babbitt metals.

For wearing properties, where a moderate speed is to be contended



End Views—Bearing Shells Having Holes and Slots to Retain Babbitt in Proper Position. Center—Cross-Sections of Ball and Roller Bearings.

with, there is undoubtedly no metal that is superior to pure zinc. But unless it is combined with some other metal it shrinks so much in cooling that it cannot be retained in the recesses and soon works loose. It also lacks those anti-friction properties which are absolutely necessary for a metal to possess, in order to stand up when subjected to high speed. The addition of tin to the zinc will counteract the shrinking tendency, so that the metal, if not overheated, will firmly adhere to the box until worn out. However this mixture does not possess sufficient anti-friction properties to warrant its use on fast running journals.

Lead and antimony have the property of combining with each other in all proportions without in any way impairing the anti-friction qualities of either. The addition of antimony with lead acts as a hardening agent upon the lead. When these two metals are mixed in the proportion of 80 parts lead (by weight) to 20 parts of antimony, no other known composition possesses greater anti-friction or wearing properties. This combination of metals runs free in its melted state, has practically no shrinkage, will stand a high speed without excessive heat or abrasion and is better adapted to light, high-speed machinery than any other.

Many persons professing to understand rebabbiting and relining of bearings do not give this precaution the strict attention it deserves. If the metal is heated to a cherry red heat and poured into the bearing shell, the outward appearance may not be impaired, but the ability of that bearing to stand up under the work assigned to it is greatly reduced because the composition of the metal has been seriously impaired by the burning it has received. The bearing metal should be heated slowly, and the pouring should be done immediately upon its reaching a temperature sufficiently high to scorch a piece of dry pine wood.

Alignment and Misalignment of Bearings.

The question has often been asked,

"Is it possible to place an old car in as good condition as it was when new?" The writer answers this question emphatically in the affirmative. Overhaul jobs improperly done are

center distance of these holes in the connecting rod so that they are even .032 of an inch closer to one another, the total head clearance will be changed from 4.81 cubic inches to

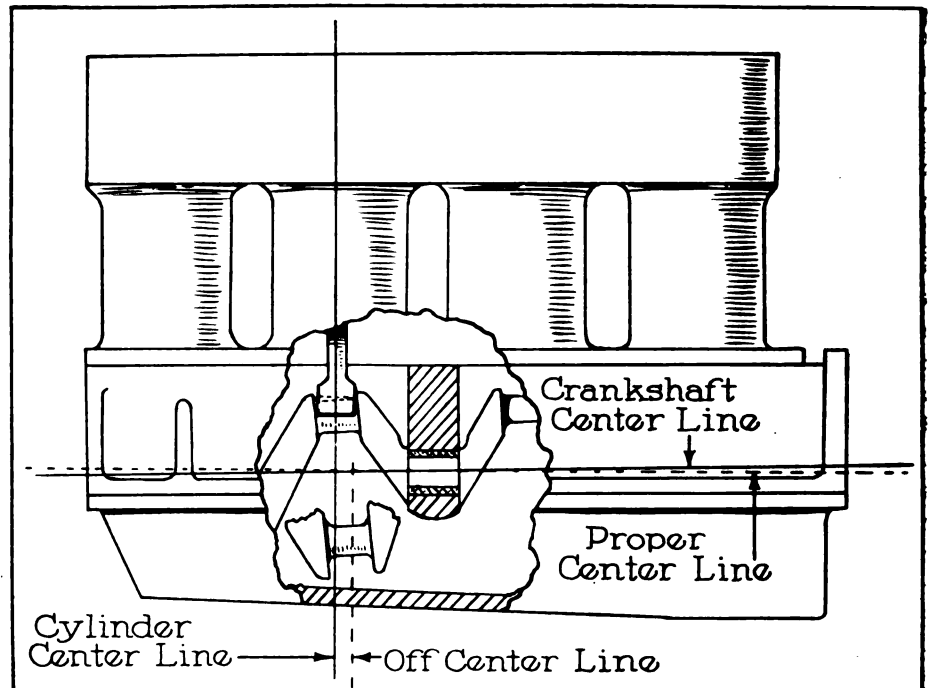


Fig. 3—Resultant Misalignment of the Engine Crankshaft and Connecting Rod After Overhaul in Which Proper Attention Was Not Paid to Vital Details.

responsible for the machine not operating as smoothly and powerfully as it did when new, whereas if this work is carried through in a proper manner the car will give remarkably good service.

We will take as a specific example the renewal of the crank end connecting rod bearings. With most garage men and mechanics it is customary to order replacement bearings from the manufacturer of the car. These bearings are received mechanically perfect in concentricity and dimension. After being received they are placed in the connecting rod ends and scraped to the crankshaft journals. The scraping in many cases is done with an absolute disregard for the correct dimensions which should be maintained between the center of the hole in the wristpin end of the rod and the one in which the crankshaft journal revolves. When this method is used, the repair will not be as efficient as the original work done when the machine was being manufactured.

On an engine having a $3\frac{1}{2}$ inch bore and a head clearance of $\frac{1}{2}$ inch, if the repairman or the mechanic, in scraping in the bearings, changes the

5.13 cubic inches. On the other hand if the holes are scraped but .032 of an inch away from one another the head clearance will be decreased to 4.49 cubic inches. It can be readily seen from these figures that the result will be improper and uneven operation of the engine. The scraping-in of the bearings may be done to a nicety, the adjustments may be of mechanical perfection, but all these good points are lost, if the regularly designed dimensions are ruined. The writer will admit the fact, that this attention to detail will increase the time and the cost of the repair work. However the repair is much more satisfactory and the mechanical dimensions of the machine are kept intact, which offsets the increase in time and labor, no matter how great it may be.

As another example of improper alignment, we will sight the usual method of scraping-in or renewing crankshaft bearings. The crankshaft of the automobile engine usually is supported in position by three bearings of the plain type. Two of these bearings control the alignment of the shaft at the engine ends, and one is placed at a central

position on the shaft to help absorb the strain and stress, caused by the engine explosions. Another reason for this center bearing is to prevent the crankshaft of the engine springing out of alignment under the severe torque present in the shaft at all times when the engine is working.

All of the crankshaft bearings must be in perfect alignment with one another, and the work of scraping-in the bearings must be properly done in order that the engine may develop its maximum power, but this is not enough. Usually the engine supplies power from one end of its crankshaft, through a gear, to operate the valve, pump and timer mechanism, while at the other end the flywheel and clutch are located. The power member of any clutch must be in perfect alignment with the driven member in order to insure satisfactory results. The gears also must run at a certain center distance from each other; otherwise the rather common, "whirring-noise," often noticed on an overhauled car is the inevitable result. All these facts make necessary the

crankshaft, liberally covered with prussian blue appear, the chances are greatly in favor of his dropping the timing gear end a few thousandths of an inch and perhaps raising the flywheel end a corresponding amount, or just the opposite result may be obtained. Figure 3 shows an exaggerated result of this kind of a repair.

When a real repair is to be done upon these main bearings, the first thing to ascertain is the amount the bearings are worn from the original dimensions. This may be done by inserting a true test shaft through the bearings and using a surface gauge or a dial indicator to ascertain the amount the shaft has worn from a parallel alignment with the planed surface of the crankcase. An arbor may then be placed in the camshaft bearing and the measurement taken over the outside of the test shaft and the arbor. The true center distance, which should check with the original dimensions of the manufacturer, will be the distance measured, minus the sum of the radius of the test shaft and that of the arbor. When new bearings are being

Renewal of Bearings.

The practise of lining journal boxes with a metal sufficiently fusible to be melted and poured from a common ladle has other advantages besides its anti-friction properties. It also is a cheap and convenient method of forming a perfect bearing in alignment with the shaft, without the necessity of boring it. Boxes that are bored, no matter how accurate, require great care in fitting and attaching them to the frame or other parts of a machine.

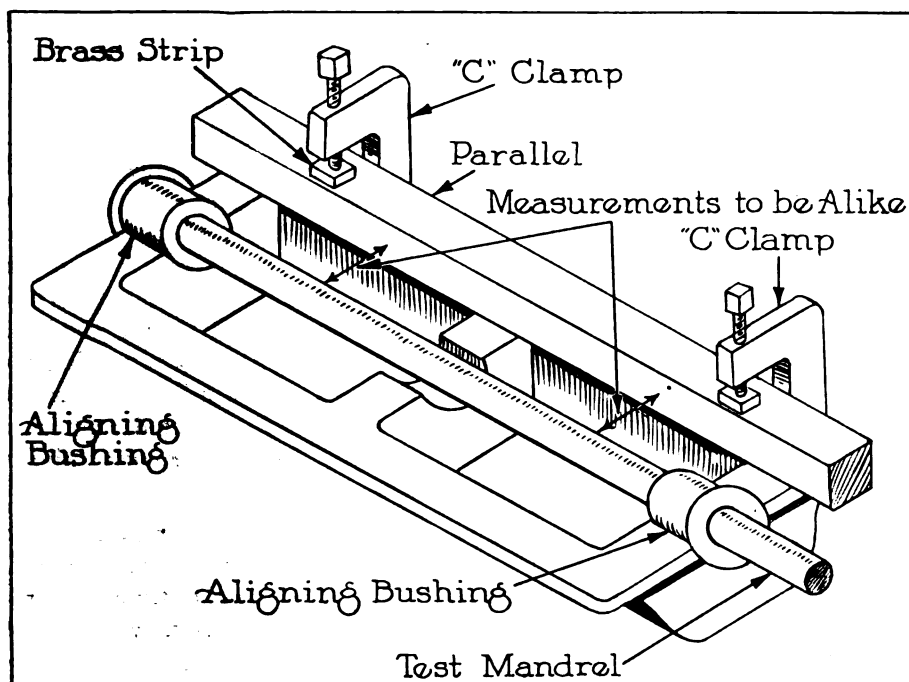
Hot Metal May Spring Shaft.

It is not good practise, however, to use the shaft for the purpose of casting the bearing, for the reason that the hot metal is apt to spring it; the better plan is to use a mandrel of the same size or a trifle smaller for this purpose. In the latter case the mandrel should be about .020 of one inch smaller than the journal, this amount of metal subsequently being removed by a line reamer.

For the purpose of illustrating the care and attention necessary when bearings are being renewed, we will follow the proper procedure in relining the main crankshaft bearings of a modern gasoline engine. It is presumed in this illustration that the mechanic or the autoist has reasons for not wishing to order new bearing brasses, but plans to reclaim the old bearings by relining them with babbitt. The engine has been removed from the car and disassembled. The tools essential in undertaking this repair are: Cast iron parallel, four inches by four inches by three feet long (this parallel must be accurate and perfectly straight); one dial indicator; one surface gauge; one test mandrel of the same size or a few thousandths of an inch less than the diameter of the shaft (this mandrel must also be accurate and perfectly straight); one vernier (preferably of 12-inch length) and an assortment of scrapers.

Melt Out Old Babbitt.

Both the top and bottom halves of the bearings should first be removed from the bearing caps and the main casting; to these bearing halves a blow torch should be ap-



Aligning Bushings Make the Position of Mandrel Certain, Parallel Is Then Exactly Located by an Indicator and Held in This Location by the Clamps.

correct location of the crankshaft when the scraping-in operation is completed.

If a repairman undertakes a repair upon these bearings by scraping wherever the marks made by a

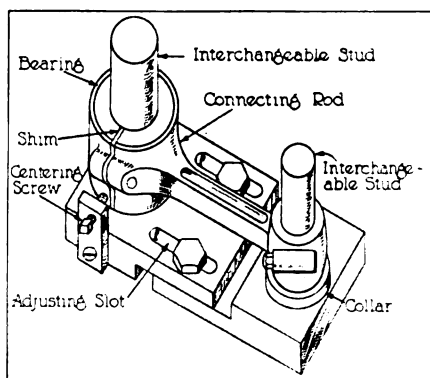
installed or repairs on the old ones being undertaken, all scraping and fitting should be done in a way to bring these measurements to the original ones used on the engine when it was being built.

plied until all the old babbit metal has been melted out. Extreme care should be taken to have the anchor slots or holes perfectly clear of all old metal, as these dove-tailed slots and holes are depended upon to retain the lining metal in position. Two bushings of the same outside diameter as the bearing holes in the casting and with an inside diameter of a size to fit the test mandrel should then be placed in the holes of the casting which retain the bearings, when the engine is assembled, one bushing being placed in the forward end of the base casting, the other being placed, in a like manner, in the after hole. They are held in this position by clamping them with the bearing cap.

These bushings must now be in the same alignment as the original holes bored in the casting when the engine was manufactured. Therefore, if the test mandrel is inserted in these bushings and supported at each end by them, it also must be in the same alignment as the bushings.

The cast-iron parallel is next placed upon the machined surface of the engine base casting and its position located exactly parallel with the test mandrel by trying each end with the indicator until the pointer registers the same all along the test mandrel from the side of the parallel. The parallel is then clamped in this position by the use of "C" clamps. The work of locating this parallel must be carefully and accurately done, as the parallel affords a ready check at all times on the relining job.

Next the mandrel should be withdrawn from the bushing holes and the lower half of the center bearing shell placed in its proper position. When replacing the mandrel, mount upon it (one on each side of the center bearing), two pieces of $\frac{1}{2}$ -inch pine board, approximately the same outside diameter as the bearing caps and an inside diameter that just fits the mandrel. Place $\frac{1}{16}$ -inch shims between the top and bottom halves of the bearing, in order to allow adjustments to be made at any time. These shims should fit against the test mandrel nicely, in



Fixture Which Aids Materially in Re-aligning and Rebabbiting Connecting Rod. Note Adjusting Slot.

order to keep the two halves separated when the babbit is being poured. When cutting the pine boards, a channel-way should be gouged in each. On one of the boards this channel-way serves for the pouring, on the other it affords an escape for the gases. The bearing retainer nuts should be tightened and the pine boards held against the shells by spring clamps. Any crevices should be stopped up with either fire-clay or putty.

Heat Entire Bearing.

While bringing the temperature of the melting babbit to the proper degree, a blow-torch should be used to heat the entire bearing. This is done to dry the bearing thoroughly and prevent the babbit cooling too rapidly, in which case the finished job will have a tendency to be pourous. When the babbit metal becomes hot enough to scorch a dry stick it should be poured immediately into the bearing. In order to obtain a good babbiting repair, a person must not stop pouring until the entire bearing is filled. If the metal is stopped when being poured it will cause a noticeable ridge to appear in the finished job.

When the babbit solidifies in the center bearing, either of the end bushings may be withdrawn without changing the alignment of the test mandrel, as it will now be supported by one end bearing and the recently poured center bearing. The two boards used to retain the babbit metal in the center bearing should now be clamped to the end which the workman intends to pour. The process should be the same on this bearing as that performed on the center one.

The completion of the pouring process on one of the end bearings allows the remaining bushing to be withdrawn from the casting, as the test mandrel is now rigidly supported in alignment by the two newly poured bearings. When the last bearings have been poured the bearing halves may be removed, the edges nicely chamfered and all the oil grooves cut, after which they should be scraped to a good fit on the crankshaft journals. While the scraping-in process is being performed the alignment should be kept in perfect concord with that of the parallel, the indicator being used to note any tendency to scrape out of alignment.

Another plain bearing subjected to severe work is the connecting rod crankshaft bearing. In overhauling this bearing usually needs readjustment or renewing. Fig. 4 shows a fixture used by the writer on many occasions, to relign these bearings in preference to installing new ones. The cut is practically self-explanatory, but a few of the advantages of this fixture will be spoken of. By loosening the center cap screws the studs may be adjusted to different center dimensions, thus allowing the rebabbiting of different size connecting rods in the one fixture. A set of studs from $\frac{3}{4}$ to $1\frac{3}{4}$ of one inch make it possible to handle practically any connecting rod relining job with this one fixture. It also makes a splendid testing device for bent or misaligned connecting rods. When this fixture is accurately made it affords a rapid and precise method of reclaiming connecting rod bearings.

If each and every repair on a car is done in a manner corresponding to the ones just outlined, there is absolutely no reason why an overhauled car cannot be made as good as new. New parts and new engines are the result of the factory man's handiwork, but this handiwork can be as skillfully duplicated in a well kept garage as in the manufacturing shop. In the opinion of the writer, what is needed most in our garages is less speed and more accuracy.

***Pertinent Extracts from Inaugural Address
of B. B. Bachman, President, Society
of Automotive Engineers***

THERE is an old saying I seem to have heard to the effect that "He who does no more than he is paid for is never paid for more than he does." I can hardly believe that this principle is applicable only in hastening the lagging footsteps of the office-boy. Rather, it is a homely way of telling us that whoever we are or whatever we are doing, the task and its completion in an honest way must mean more than the reward, if we are to succeed. Is it not possible that in recent years profits have loomed larger than service to the manufacturer and the merchant? Have not wages seemed of more moment than increased efficiency to the workman?

I would like to be able to point out to you a glowing program for the coming year, but the more I have thought the more strongly am I impressed with the fact that to progress in the times that are ahead of us, we must get back to fundamentals and measure our plans and purposes by the plain and commonsense yardstick—Service.

We must, if we are to continue our growth and maintain our prestige, serve our members, particularly the younger men, for upon the engineer rests a large responsibility in solving many problems that are spread over the road our industry must travel in the coming years. To meet these responsibilities, we must be continually widening our horizon.

It is essential that there be brought into the engineer's mind and into the drawing-room and laboratory a clearer conception of manufacturing and merchandising. In other words, to meet our responsibilities, we must be more than technicians; we must be business men and view our problems from the commercial side as well as the technical. I know of no better way in which this viewpoint can be developed than by the contact which active participation in the affairs of the Society provides opportunity for.

IS IT TO BE STATE TESTED GASOLINE?

BELOW is published, in part, an act submitted to the law-makers of Rhode Island. The object of this act is to standardize the quality of gasoline sold in the state and to provide means by which the act, if it becomes a law, may be rigidly enforced and a check kept on all gasoline handled by dealers. All told, the Rhode Island registration lists show that there are close to 60,000 every-day users of gasoline and the interest manifested by them in this act is pronounced. The author of the act is now an extremely popular member of the assembly from the viewpoint of Rhode Island car owners.

SECTION 1. For the purpose of this act all gasoline which may or can be used for illuminating, heating or power purposes, shall be deemed to be subject to the inspection and control as herein provided for; and it shall be unlawful for any person to sell any gasoline that has a gravity less than 55 degrees Beaume as determined by registered hydrometer Beaume scale at a temperature of 60 degrees, Fahrenheit, for any such purpose, that has not been so inspected and approved.

MOTOR gasoline shall also comply with the following specifications:
Quality—Gasoline to be high grade, refined and free from water and all impurities.

Inspection—Before being sold or offered for sale the gasoline shall be inspected. The samples immediately after drawing will be retained in a clean, absolutely tight closed vessel and a sample for test taken from the mixture in this vessel directly into the test vessel.

Test—One hundred cubic centimeters shall be taken as a test sample and these rules shall be followed:

- (a) The initial boiling point must not be higher than 140 degrees Fahrenheit.
- (b) Twenty per cent. of the sample must distill below 221 degrees Fahrenheit.
- (c) Forty-five per cent. must distill below 300 degrees Fahrenheit.
- (d) Ninety per cent. must distill below 430 degrees Fahrenheit.
- (e) The end or dry point of distillation must not be higher than 450 degrees Fahrenheit.
- (f) After complete distillation the residue shall not be over three per cent.

Measures—All standard measures used for the distribution of gasoline shall be subject to inspection and to condemnation, if not in accordance with the standard.

Cleanliness—All tanks and other containers shall be originally free from foreign substance. No material fluid or substance shall be sold or offered for sale or labelled "gasoline" which contains more than five per cent. of solid matter.

Sec. 2. For the purpose of enforcing the provisions of this act, the office of the inspector of gasoline is hereby created, and within 30 days after the

passage of this act the governor shall appoint, by and with the consent of the senate, a suitable person who shall act as an inspector of gasoline. If the senate is not in session at the time of such appointment, the appointment shall be effective until acted upon by the senate next in session.

Such inspector of gasoline, hereinafter called the inspector, shall be appointed for a term of three years, or until his successor is duly appointed and qualified. Said inspector shall give a bond in the sum of \$10,000, to be approved by the governor, for the faithful performance of the duties of his office. * * *

Said inspector must appoint, with the approval of the governor, such deputies as may be required, not exceeding six in number, who shall perform the duties under the direction of the inspector, and may reside or be located at such place in the state which will permit the most convenient execution of their duties. * * *

The inspector must require a deputy to file a bond for the benefit and use of the state, in the sum of \$5000; and for breach thereof, the inspector shall have the right of action in his own name for the recovery of any loss, by reason of any fault by a deputy; and the state shall also have right of action to recover loss, if any, it may have sustained through default of a deputy.

Sec. 3. The said inspector appointed under the provisions of section 2 of this act shall receive an annual salary of \$3000. The said deputy inspectors appointed under the provisions of section two of this act shall receive a monthly salary of \$150 per month.

Said inspector may employ necessary clerical assistance and may incur such expenses as may be required.

For the purpose of paying the said salaries and for other necessary expenses of said office, the sum of \$17,000 is hereby annually appropriated. * * *

Sec. 5. The inspector and any deputy is given power to make an inspection of oils in whosever hands such oils may be found; and is given power investigate in order to determine whether or not such oils have been properly inspected before being offered for sale; and is given power to ascertain whether or not inspection fees have been paid. Upon completing such inspection the inspector or his deputies may exact the fee of two mills per gallon of gasoline, and shall place upon the container an inspection stamp properly cancelled, which will indicate that the gasoline contained within said container has been properly inspected, or when gasoline is in transit,

or in a container not readily stamped, he may issue a certificate properly countersigned, stating that he has made such inspection. Said gasoline after being stamped shall not be reinspected, unless in the belief of the inspector or his deputies a fraud has been committed and the gasoline is being sold in violation of law.

Sec. 6. In the performance of his duties the inspector or his deputies may inspect all records relative to receiving, forwarding, or transporting oils or gasoline: provided, however, that the inspector or his deputies must not divulge any knowledge concerning these records, or in any way permit any one to receive information concerning such records, which would be prejudicial to the owner of such records.

Sec. 7. In the performance of his duties, the inspector or his deputies is given power to administer oaths, and he or his deputies shall not be liable for costs in any prosecution which may occur under the provisions of this act. It is hereby made the duty of the inspector to prosecute all violations of this act. * * *

Sec. 10. No inspector or deputy while in office is permitted to be directly or indirectly interested in manufacturing or selling any oils or gasoline, nor is he permitted for the purpose of inspecting, testing or gauging, to take away or appropriate for his own use, or for the use of others, any part of said oils.

Sec. 11. The inspector and deputies must keep a correct record of all oils inspected by them, of all stamps, certificates and other property coming into their possession, and of the persons and corporations to whom they are issued, in a book provided by the state, which book is to be open to inspection by the governor, or any person designated by him as well as all other persons interested. Detailed reports to the governor must be made annually by the inspector's office of the business transacted. All money collected as inspection fees must be remitted to the general treasurer once each month.

Sec. 14. Any person violating any of the provisions of this chapter shall be guilty of a misdemeanor, and for first offense shall be fined not exceeding \$20, for second offense shall be fined not exceeding \$100 and for third offense shall be fined not exceeding \$500, or imprisoned in the Providence county jail for 30 days.

Sec. 15. This act shall take effect upon its passage, and all acts and parts of acts inconsistent herewith are hereby repealed.

Motor Truck Operation Pays Well

Owner Using 3½-Ton Acme Truck in Road Construction and Maintenance Service, Claims Profit of More Than \$2000 in 27 Days' Work.

THE experience of C. A. Harrington, Minneapolis, Minn., shows the possibilities of motor truck operation profits in road construction and road maintenance service during winter months, which demonstrates how a man can purchase a truck with assurance that he will be able to pay for the truck, make a good living for himself and at the end of a given period show a profit.

There is no question but that the experience of Mr. Harrington has been duplicated many times by other motor truck owners in other lines of service aside from road construction, but his experience is interesting because it comes from a state noted for its severe winters and poor condition of its country roads.



C. A. Harrington and His Dividend Paying Acme. There's a Reason for the Smile.

MR. HARRINGTON states that he purchased this 3½ ton Acme truck about two years ago, and has been using it steadily ever since on road building jobs, with occasional jobs of excavating on the side. Most of his work has been in the State of Minnesota, and a great deal of it in the northern part, where it is often necessary to work with snow on the ground.

"During the time I have had my truck," he says, "I have traveled over 15,000 miles, averaging about 55 miles per day. On one road building job I averaged over 80 miles per day for four months, and on one particular day I drove 125 miles in 10 hours, hauling 248 yard miles of gravel. The conditions were ideal on that occasion, as I had no waiting either to load

or unload, and the roads were in good condition for hauling, allowing me to haul eight loads of four yards each a distance of 7½ miles.

Road Work Hard on Truck.

"As a general rule road construction service is very hard on a motor truck as the season is short, making it necessary for the truck to work overtime and carry heavy overloads, over roads that are often in poor condition. The truck is operated about 180 days per year and the cost of operation is \$19.40 per day including driver's wages, thus giving a cost of 34.83 cents per mile. Actual repairs for the 18 months were \$426, including the overhaul of the engine.

"Working in the country on sandy roads, gasoline mileage shows about two miles per gallon, while

he has been able on other haulage work to get as high as six miles to the gallon. A fair average for the 18 months is 3.75 miles per gallon of gas and 140 miles per gallon of oil."

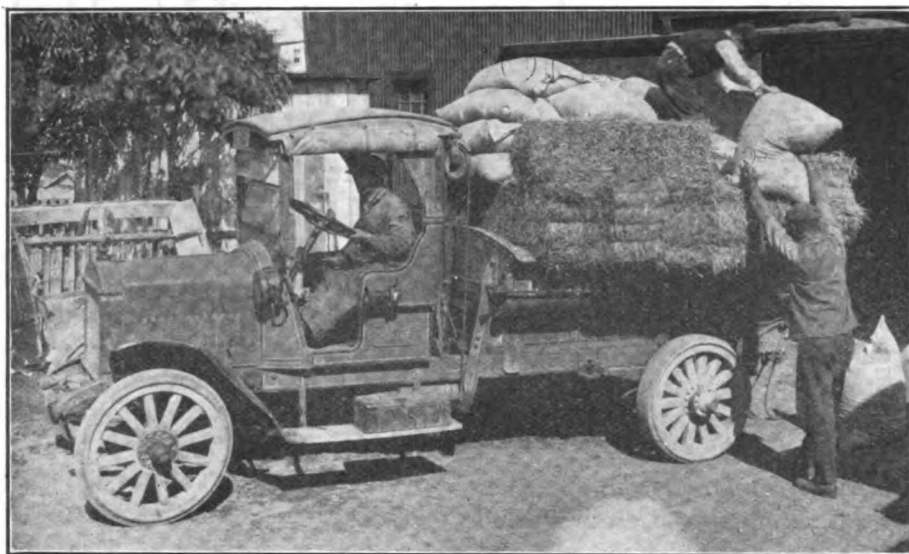
A previous Acme dump truck owned by Mr. Harrington earned for its owner in 27 working days total earnings of \$2,640. Taking present average cost of \$19.40 per day as a basis, his profits were over \$2,000. On the day that 248 yard-miles were hauled 40 cents per yard-mile was received. His earnings that day were \$99.20, and his profit \$64.67.

Mr. Harrington speaks a good word for the Acme truck, the fact that he had operated one previous to buying the second, indicates that he is well pleased with this make truck, especially for road construction work where it is often difficult to pull out of excavations and over bad grades.

Uses Acme in Ash Collection.

Another good example of "Acme economy" is that of a two ton truck owned by C. R. Firth of Crum Lynne, Pa., which at the present time is doing the work formerly done by three two horse teams, each operated by a driver and helper, the truck showing a daily saving of \$16.83 over the former method of ash removal and an annual saving of \$4,375.50.

Mr. Firth states, "that since October, 1920 the truck has been used chiefly in ash collection work in the city of Chester, Pa." This work being done under contracts secured in competitive bidding. The truck is used five days a week, the trip consisting of driving into the city which is two miles, and starting ash collecting as soon as the city is reached. Two helpers are required, who walk alongside, picking up the baskets and boxes of ashes and dumping them into the



This Acme Gets Hard Usage but Careful Driving Keeps Repairs at a Minimum.

truck. The main street is cleared first to be out of the way of the business rush which follows later in the morning, and the parking of automobiles which would naturally hinder ash collection later in the day.

"As a rule three to four blocks are covered to get a full load. As soon as four cubic yards of ashes are on the truck, it is driven to the dump, the trip varying in length from three blocks up to two miles each way. Since the truck is equipped with dump body, only a few minutes are required to dump the load, allowing the truck to immediately return for the next load.

Makes 15 Trips a Day.

"The truck has been averaging between 12 and 15 trips to the dump per day and at the end of the day is driven back to Crum Lynne. The truck averages about 40 miles a day and in spite of a great deal of operating at low speed and the power required to operate the hoist, 5.7 miles to the gallon of gasoline is obtained on an average.

"Once a month the truck makes a trip to Philadelphia to bring back a load of feed. Occasionally it is hired out to do general hauling for other people, plenty of odd jobs being available for a truck of this type if the owner wishes to take them.

"Repairs so far have cost \$50.10 for a frozen radiator and a snapped spring, so that \$150 per year is considered ample to cover this item.

"My time is occupied in handling the truck, another two tonner and

16 horses, so that \$500 a year salary must be charged against this truck. There is no charge for garage as the truck is kept in the owner's building that would not be used for any other purpose.

"The cost also includes the wages of the driver at \$5 per day, and two helpers at \$4 per day each.

Motor Truck Operation Pays.

"This two ton truck costs \$22.17 a day, 55.42 cents per mile, 41.07 per cubic yard, and 27.17 cents per cubic yard mile."

Formerly Used Horses.

Mr. Firth, for 25 years, performed this work with horses and he has now been doing the work for three years with motor trucks and he knows how they compare on every kind of work that he does. On ash collection work it would require three teams to do the work of the two ton truck. Each team would require one helper and would cost about \$13 per day. The three teams would, therefore, cost \$39 per day, or \$16.85 more than the truck. Figuring that the truck operates five days per week, this easily means a saving of \$4,375.80 a year.

Then too the horses would not be as dependable as the truck, as hot weather would affect them, while in cold, icy weather they would require sharpening at just the time that they should be busy, requiring a long wait in the blacksmith shop to get them sharpened.

Excellent care has been given this truck which accounts in a great

measure for the low repair expense. The same driver has had charge of the truck continuously, making inspections at regular intervals, oil and greasing it according to directions. When anything goes wrong requiring expert attention and prompt service is obtained from the Philadelphia dealer.

It is the policy of Mr. Firth to hire good drivers and treat them well, keeping them interested in their job. If their work is completed early, they are allowed to have the rest of the day to themselves. This creates a feeling of good fellowship between the drivers and Mr. Firth and works to mutual advantage, and also makes them willing to work overtime in rush periods.

Average Cost of Operating a Two Ton Acme Dump Truck Owned and Operated by C. E. Firth, Crum Lynne, Pa., Over a Period of 117 Days.

Cost per day (including driver and helper).....	\$22.1682
Cost per mile.....	.5542
Total cost for period.....	2,593.68

Operation

Days operated	117
Miles traveled	4860
Miles per day.....	40
Miles per gallon of gas....	5.7
Miles per gallon of oil....	160

Itemized Cost.

Driver and helper cost per day (included above).....	\$13.00
Depreciation per mile.....	.0547
Maintenance and repair estimated per mile.....	.0144
Tire cost, estimated per mile	.0236

NOTES ON BRITISH AFRICA.

Tooth harrows are used more than any other in South Africa, but there is a constantly increasing demand for the disk type.

Windmills and well-drilling machinery offer a good market in South Africa. The Government and private firms and individuals are excellent prospects. The year 1921 showed an increase in buying of these articles as compared with 1920, and the demand for them continues unabated, with excellent prospects for further increase in 1922. The trade in windmills is largely in the hands of American manufacturers, and, although British manufacturers are showing an increased interest in this market, there is no reason why the American product can not hold its leading position.

In northern Transvaal there is considerable increased farming activity, and the demand for implements and machinery in this section is well worth attention.

THE MOTOR BUS FIELD

A DEPARTMENT DEVOTED TO THE
INTERESTS OF MAKER AND USER

MANUFACTURE — DISTRIBUTION — OPERATION — DEVELOPMENT — NEWS

Kansas Community Finds "Bus" Synonymous with "Service"

F. W. D. Rail Cars Prove Economical and Efficient
When Tried as an Experiment—Have Entirely
Displaced Trolleys in Mid-West City.

A GAIN the Motor Truck steps into a new field and again it proves its versatility and adaptability beyond question. For the first time in Kansas gasoline propelled cars have been put into city railway service to replace electric trolley cars.. This installation has been made by the Manhattan City and Interurban

Railway Company of Manhattan, Kan., which recently scrapped its heavy electric cars and equipment and is now operating four FWD railway cars, manufactured by the Four Wheel Drive Auto Company, of Clintonville, Wis., which also builds the well known FWD motor trucks.

A FEW years ago the idea of operating a motor truck on rails would have been laughed at, yet the chassis for these cars are the same as the chassis used in the standard FWD 3-ton truck with the exception of those changes which are necessary to fit the trucks for rail service. These cars are operating on the same rails over which the electric cars formerly operated and according to the same schedules.

Busses Cost Less to Operate.

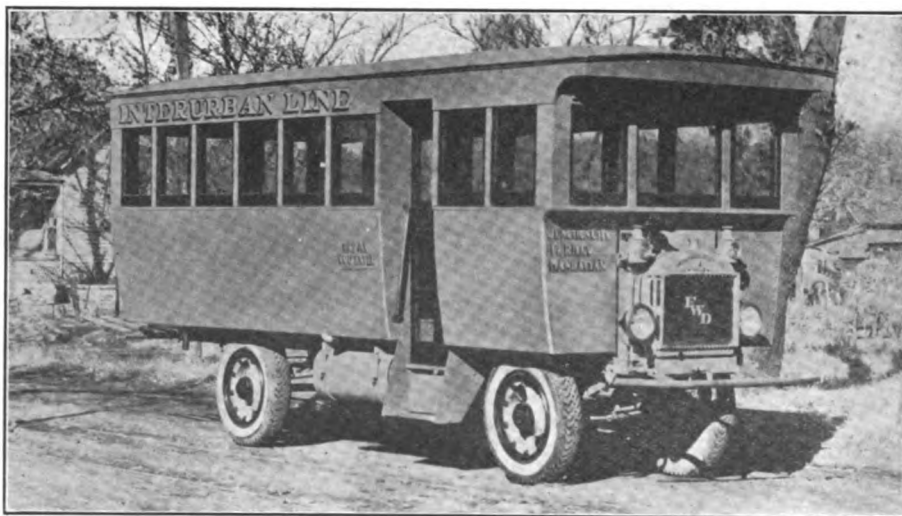
The excessive cost of operating the heavy electric cars for a patronage which has decreased considerably since the war, was the deciding reason which influenced officials of the Manhattan City and Interurban Railway Company into buying lighter equipment. It cost them between forty and fifty cents per mile to operate electric cars and they give the public just as good service now at a cost of about fifteen cents per mile. But they gained more than simply a reduction in operating costs by installing motor equipment; they reduced their number of employees, one man operating

a car instead of two; they eliminated the expense involved in the operation of a power plant and three sub-stations; they are able to operate their motor equipment with less noise and less annoyance to the public; they reduced their cost of maintaining their right of way, the new equipment being much lighter and less destructive to the rails than the heavy electric cars; they reduced the liability of damage suits resulting from accidents, which were

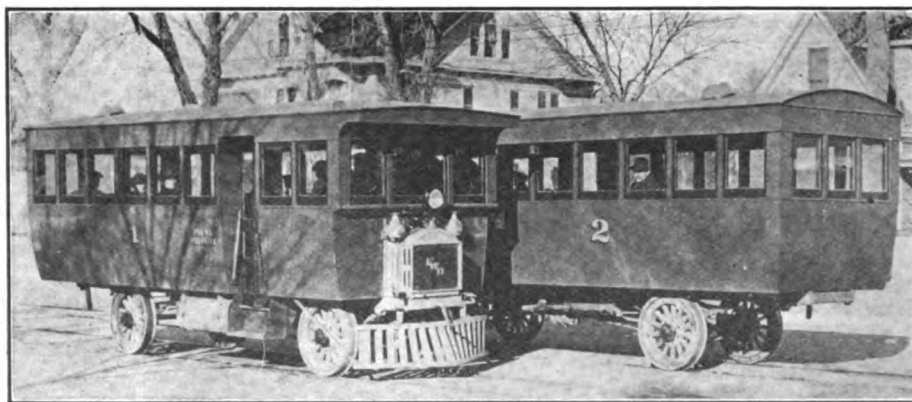
quite frequent when the electric cars jumped the tracks. Besides all of these advantages this company has done its bit toward beautifying Manhattan through the removal of overhead trolley wires and poles from the city streets.

Has Good Seating Capacity.

Each car provides a seating capacity of 32 persons and a space for baggage. The cars are well finished inside and afford great comfort to passengers. Some of the



Type of Bus That Has Given Economical and Efficient Service in Kansas.



FWD Rail Busses in Residential District, Manhattan, Kan.

other features of the cars are as follows: 156-inch wheelbase, high speed reverse gears which enable the cars to go as fast in reverse as they will go forward; locomotive type "cow-catchers;" electric starters and lighting devices; heating systems which utilize the heat from the motor exhaust; entrance and exit near the front of the car with the door operated by the driver. In addition to the rail cars they operate one bus on the highways between Junction City and Fort Riley as a feeder to their interurban line.

Bus Looks Like Rail Car.

This bus looks somewhat similar to the rail cars, having the same kind of body. The weight of the chassis in each case is 7200 pounds, as compared to 60 000 pounds which is the weight of the heavy and noisy electric cars.

The two cars operating on the city lines average about 95 miles

each per day and 500 stops each per day, while the two cars in interurban service average 150 miles each per day and about 250 stops each.

Steep Grades and Sharp Curves.

Both in the city and on the interurban line between Manhattan and Junction City there are many steep grades and sharp curves in the tracks. At one place the cars travel up a five per cent. grade, which is 2500 feet long, and another three and one-half per cent. grade which is 4000 feet long. The curves encountered by these cars vary from less than one degree up to a curve with only a 45-foot radius.

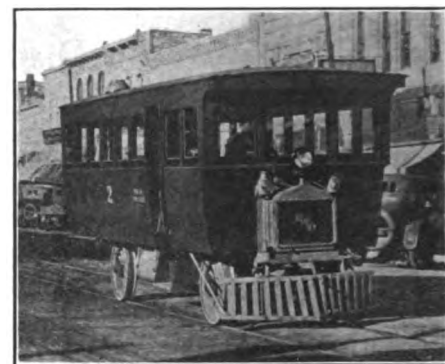
When the first snow of the winter arrived at Manhattan, citizens were doubtful as to the ability of the cars to operate in the snow without the use of a snow plow as had been the custom with the electric cars. But all doubt was cleared away when the trucks, with little difficulty,

plowed through the deep snow, which was drifted in places to a depth of two feet.

Trucks Obtain Maximum Traction.

With the load equally distributed over the four wheels and with every wheel a driving wheel, these FWD trucks obtain a maximum amount of traction, which makes them particularly well adapted to service over steep grades, around sharp curves and over snow covered rails such as they encounter in the service on the Manhattan lines.

Regarding the service given by their motor equipment and the cost of operating it, company officials state that the installation is a great



One of the Busses That Has Exemplified the Word "Service."

success. They also state that not one complaint about the service with the new equipment has been received, which speaks pretty well of the patrons' satisfaction and which goes to prove that service is the secret of universal satisfaction.

Street Railway Companies Operating Motor Busses

ARKANSAS.

Intercity Terminal Ry., Argenta.

CALIFORNIA.

Bakersfield & Kern Elec. R. R.
Pacific Electric Ry., Los Angeles.
San Francisco-Oakland Ter. Rys.
Pacific Gas & Electric Co., Sacramento.
San Francisco Municipal Rys.
San Jose Railroads.
Santa Barbara & Suburban Ry.
Stockton Electric Ry. Co.

CONNECTICUT.

The Connecticut Co.

IOWA.

Dubuque Electric Co.

MARYLAND.

Baltimore Transit Co., controlled by United Rys. & Elec. Co. of Baltimore.

MASSACHUSETTS.

Bay State System.
Connecticut Vy. St. Ry., Greenfield.
Holyoke Street Ry.

MICHIGAN.

Escanaba Pwr. & Trac. Co.

MISSOURI.

St. Joseph Ry., Lt., Ht. & Pr. Co.

NEW YORK.

Niagara Gorge Bus Line (controlled by Niagara Gorge R. R.

Co. (Niagara Falls.

OKLAHOMA

Okmulgee Traction Co.

PENNSYLVANIA.

Citizens' Transit Co., controlled by Citizens' Traction Co., Oil City.
Johnstown & Somerset Ry.

TEXAS.

Ft. Worth Auto Bus Co., controlled by Northern Texas Traction Co.

WASHINGTON.

Seattle Municipal Ry. Co.

WISCONSIN.

Milwaukee Elec. Ry. & Lt. Co.

The Garford City Coach

RAPID development in motor bus operating problems which tend toward the betterment of passenger transportation has been the means of creating the Garford Model 51 City Coach. Designed primarily for the ease, comfort and rapid transit of the passengers carried, this coach of special structure

throughout, will solve many problems of the newer and more recently developed classes of motor bus service. In the design of the special chassis and special body are incorporated features which are necessary to the present-day successful operation of gasoline coaches.

ASPECIALLY designed engine containing power characteristics necessarily apart from the conventional motor truck engine is provided. A wide range of engine speeds with the economy of fuel and oil and the ability to endure long periods of operation, and, accessibility for inspection, repair and service are the dominating features of this bus engine.

Frame 25 Inches From Ground.

With its frame only 25 inches from the ground, a low loading height is provided. Passengers, when entering or leaving, need only take one step to be within the bus, or to alight from it. This facilitates rapid loading or unloading, making possible shorter steps and faster schedules. The width of this special bus frame exceeds that of the ordinary motor truck and tends towards more rigid mounting of body.

Has Wide Tread.

A special wide tread has been designed for the prevention of body swaying. Chances of skidding are also greatly reduced with tread of wheels of such width as contained in this chassis.

Springs are Very Flexible.

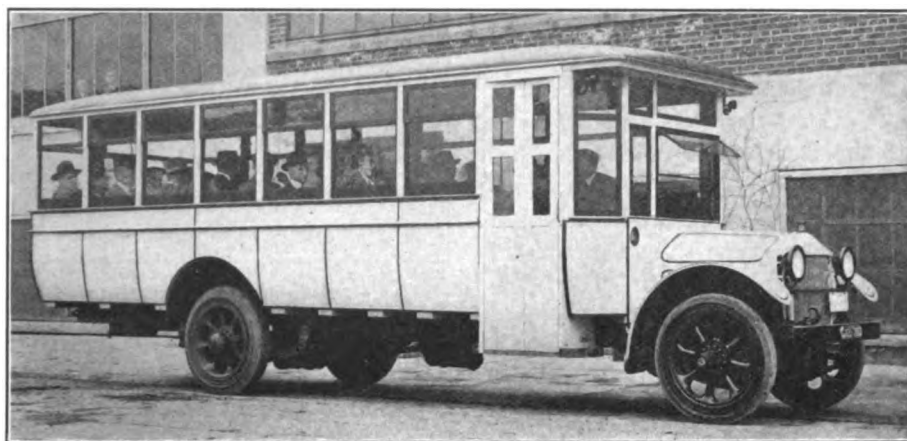
The springs are of such length and of such flexibility as to make easy riding qualities particularly noticeable.

Brakes Provide Safety.

An abundance of braking power, which has been found vital to bus operation, is embodied in the chassis, providing greater safety for load in heavy road traffic.

Steel Cushion Wheels.

Special steel cushion wheels are a part of the equipment. These wheels participate in the relief from excessive vibration and in the increased comfort to passengers when coach is in operation.



Wide Range of Engine Speeds is a Feature of This Garford City Coach.

Other Special Features.

Other special features are the arrangement of gasoline tank in such position as will eliminate any danger from fire; the position of all control levers which are placed within easy reach of driver and the driver's seat in such position as will give full vision of traffic.

With the creation and design of the chassis, the Garford Motor Truck Company have designed a special body for the chassis. This body provides a seating capacity of from 25 to 29 passengers, contains ample aisle and seating space. It is equipped with cross-wise seats having either Rattan or imitation leather upholstery; heating and lighting system; electric lights, electric buzzer system with push buttons at each window post; entrance

door, folding type, on right side of body, operated by driver; rear emergency door and advertising panels.

Ruggedness of build, rapid acceleration, smooth operation at high speed, low loading height, possibilities of fast schedules, elimination of body swaying and skidding dangers, easy riding qualities extended through special springs and cushion wheels, safety amplified by special brakes, comfort developed through improved body design—are the characteristics of the Garford Model 51 City Coach.

William B. Todd, for the past 20 years connected with the Union Drawn Steel Company, Beaver Falls, Pa., in various departments of the company until he became vice-president, has resigned and, on Feb. 1, assumed his new duties as manager of sales of the cold-rolled department of the Jones & Laughlin Steel Company, Pittsburgh.

Harold H. Smith, formerly secretary-treasurer and chief engineer of the Transportation Engineering Corporation, New York City, is now associated with the Philadelphia Storage Battery Company, Philadelphia, with headquarters in the New York City office.

Fred C. Booth has been appointed territorial service manager of the Hulett Motor Car Company, 1884 Broadway, New York City. His former connection was sales engineer for the Cleveland Automobile Company, Cleveland.

MARYLAND NOW HAS 90 BUS LINES.

NINETY bus lines in Maryland have an average of 3 vehicles per line carrying an average of 16 passengers per vehicle that operate over an average distance of 19 miles per one way trip.

BALTIMORE TRANSIT INSTALLS REPUBLICS

IN October, 1921, a Republic Knight-motored bus was put into test operation over their Charles Street route, and during a period of five months, was subjected to a passenger loading and mileage equivalent to nine months of actual operation.

AS A result of this test installation, the Baltimore Transit Company has just placed with the Republic Truck Sales Corporation, Alma, Michigan, an order for 26 Republic Knight-Motored Busses of the type shown in the accompanying illustration. The view shows the bus receiving passengers in front of the Washington Memorial at Baltimore.

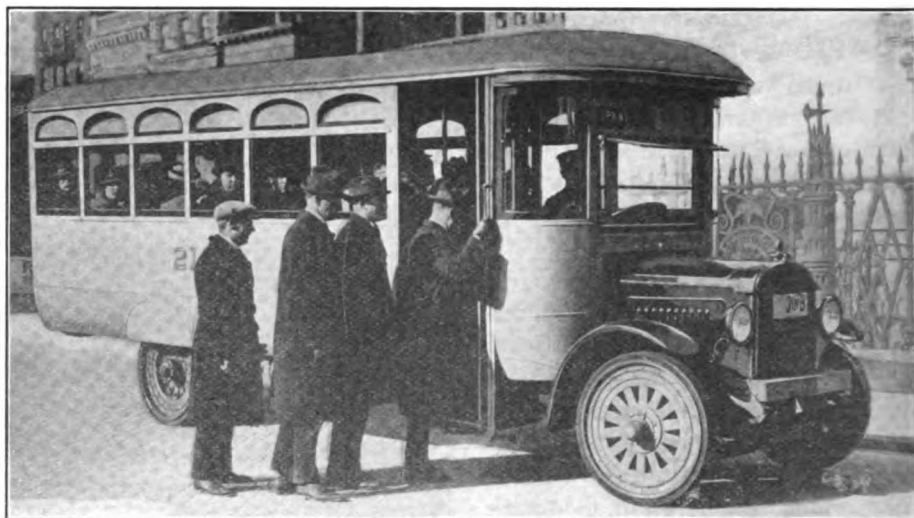
High Efficiency Shown By Bus.

The average mileage per gallon of gasoline, during the entire five months of the test, was 8.6, and during the last thirty days of operation, this increased to 9.3 miles per gallon. The complete bus was disassembled at the end of the test period and found to be in perfect condition mechanically, after operating more than 16,000 miles. The cost of repairs during the period was less than \$25.00.

The sale of these 26 Republic Knight-Motored busses to the Baltimore Transit Company is the outgrowth of activities initiated about one year ago, when the Republic Truck Sales Corporation became convinced of the latent possibilities of the motor bus for supplementary and feeder service to existing railways.

Public Utilities Division.

A Public Utilities Division was created as part of the Republic organization, under the direction of Ralph M. Sparks, a passenger transportation expert of broad experience in the traction field. After extended study, which covered the principal cities of the United States and Canada, where busses were operated, Republic engineers designed a motor bus, based on the results of the investigation, which left them convinced that the ordinary truck



Republic Knight Motored Bus. Note Perfect Balance of Body.

chassis was not suitable for passenger transportation.

Republic Knight-Motored Bus.

The Republic Knight Motored Bus consummates all recognized essentials of successful passenger car service. These essentials include a body built low to the ground to facilitate entrance and egress of passengers, ample aisle space and headroom, dependable service, comfort of passengers and pleasing appearance.

To these important essentials is added complete absence of noise and vibration, through the use of the celebrated Knight sleeve valve Motor. This motor, during many years of use by successful bus operators in New York, London and other important points, has proven

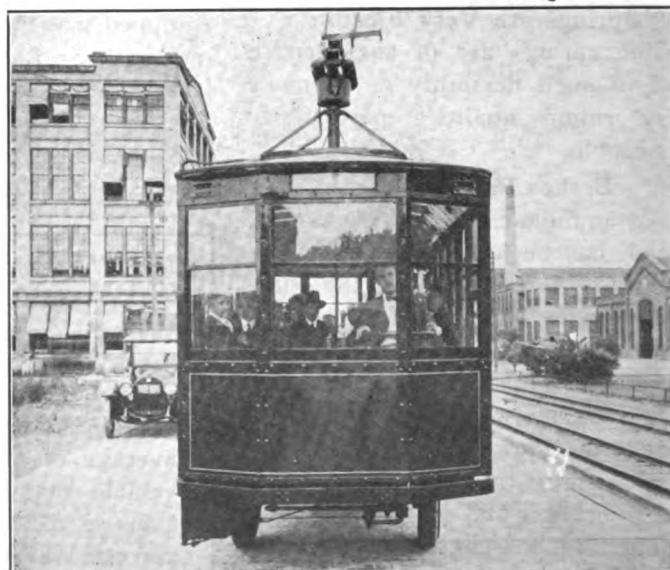
itself for passenger transportation service.

The public utilities division of the Republic Truck Sales Corporation has been in consultation with a number of the largest railway companies in the East, and satisfactory progress has been made in helping solve the peculiar problems incident to establishing profitable motor bus service as a supplement to their existing lines.

Louis Steinfurth, formerly assistant chief engineer for the Acme Machinery Company, Cleveland, is now chief engineer for the Economy Engineering Company, Willoughby, Ohio.

Clarence B. Buxton has joined the forces of the American Locomotive Company, Schenectady, N. Y. He was previously works manager of the Modern Tool Company, Erie, Pa.

Trackless Trolley Equipped with G. E. Railway Motor, Controller and Collecting Device.



The Improved Highway

(By FRANK M. HINKLE.)

I CARRY you from the frenzied trading place and lead you beside the running brooks.

I take you from the roar of the city's fevered mart, and lead you beside peaceful waters.

I carry you mile upon mile, away from dull care and humdrum monotony—through friendly meadows, and laughing flowers, and sparkling dew, into the sunlight, into the outdoors and the great open, and bid you drink deeply from the fountain of a life that ever is!

I lead you under the soft clouds, piled up like mountain waves in a sea of wondrous blue.

I take you out and on and forever on, into sunlit realms of placid quietude: out where feathered choirs sing anthem and roundelay in the branches of a thousand trees—out where nature makes loving mockery of the vain artistry of man.

I TAKE you through honey villages, through snug hamlets, through dale and dell and pleasant nook, through ever-stretching lanes far and away to the highlands where summits kiss the face of the sky.

I carry you over the spreading plains, over lowlands gently rolling, up and down the slopes, ever and on, everywhere and evermore.

Safely over high flung spans, looking down on torrents boiling and thundering—under great keystones thrown into nature's giant archways cut from the eternal hills—under frowning cliffs o'erhanging, where jut the defiant rocks of a million ages—onward I lead you, and onward still.

I CARRY you over the rugged mountains—beside crags upward rearing—under the sturdy oaks—under the redwoods—through gorges and valleys and canyons—skirting the water falls where the glistening cascade has been tuned by the infinite to the music of the universe.

And beside the gentle river, where the voice of God speaketh ever to the answering heart of man and the purling waters whisper love to human kind—and thence to the tranquil lake, and on to the ocean's shore where the soul of man looketh out upon the vast un-resting sea and saith unto itself, "Thou art of infinity!"—behold, I lead you on.

And thus I serve through all the passing years, and men do call me blessed evermore.

I am—the Improved Highway!

CARS AND TRUCKS SHOW BIG INCREASE

WITH returns received from all states, the Bureau of Public Roads of the United States Department of Agriculture reports that the motor vehicle registration for the year 1921 totaled 10,448,632. This represents an increase of more than 1,000,000 over the 1920 figures, or a number equal to the total number at the beginning of 1913.

THE greatest increases in registration were in industrial sections, the agricultural sections in general showing a smaller amount of increase. No state reported a registration less than the 1920 figures. The total amount collected as fees of various kinds amounted to \$122,478,654.

It has been expected that the registrations this year would show a greater falling off in the rate of increase than the figures reported show. The increase this year continues approximately the same average rate that has been maintained for the last seven years and shows no

indication of the near approach of a condition of saturation in the supply of motor vehicles.

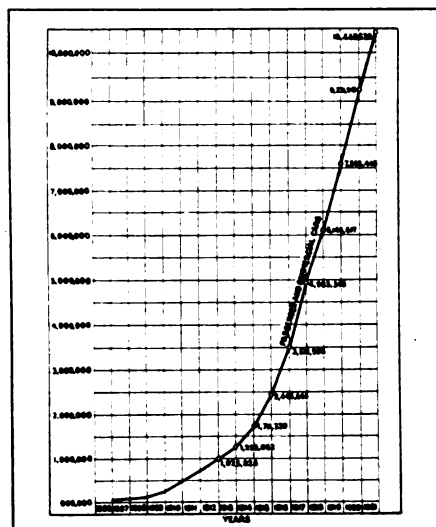
With more than 10,000,000 vehicles in use and the owners demanding im-

proved roads over which to operate them, the question arises as to how long the country will have to wait for a connected system of highways covering the whole United States, say officials of the bureau.

The recent Federal Highway Act provided for the construction of a connected system of highways consisting of not more than seven per cent. of the roads in each state and made an initial appropriation of \$75,000,000 to be used in conjunction with state funds. The system to be built is now being outlined and it will comprise about 180,000 miles of road, included in which there will be about 60,000 miles that are already completed.

With an annual programme based on a Federal appropriation of \$75,000,000, and assuming that the states will continue to match the Federal funds in the same ratio as heretofore and that the average costs of the roads built will be \$20,000 a mile, officials say it will take 15 years to complete the proposed system. If the Federal appropriations are made at the rate of \$100,000,000 a year the system can be completed in 10 years, and if only \$50,000,000 is appropriated annually it will take 20 years to build it. The question is how long can we wait.

REGISTRATION OF CARS AND TRUCKS 1906-21.



National Highway Traffic Association Will Hold Annual Meeting May 12

THE annual meeting of the National Highway Traffic Association will be held at the Automobile Club of America, 247 West 54th street, New York City, on Friday, May 12, 1922. The afternoon and evening sessions will be devoted to a consideration of the reports of the following national committees:

AFTERNOON Session—2 o'clock. Report of national committee on Uniform Highway Signs; chairman, Elmer Thompson, secretary, Automobile Club of America.

Report of national committee on "Traffic Capacity and Widths of Highways Outside of Municipalities;" chairman, Herschel C. Smith, assistant professor of Highway Engineering and Highway Transport, University of Michigan.

Report of national committees on "Status of the Construction of Highway Curves and Recommended Practice to Increase Safety to Traffic;" chairman, H. Eltinge

MAKERS PLAN TO ISSUE SAFETY-TAG.

BOSTON, APR. 17—Motor car and motor truck manufacturers of the National Automobile Chamber of Commerce have recommended that with each new car put on the market a safety tag be provided setting forth some fundamental traffic precautions to encourage safe driving.

Breed, consulting highway engineer, New York City.

Report of executive committee on "Highway Improvement Creed" of the National Highway Traffic Association.

Informal Dinner—6 P. M.

An informal dinner at \$1.50 per cover will be served in the grill room at 6 p. m. The public is cordially invited to attend the dinner. Reservations for the dinner should be sent to Secretary Elmer Thompson, 247 West 54th street, New York

City, as soon as possible.

Evening Session—8 O'clock.

Report of national committee on "Regulations Governing Speeds, Weights and Dimensions of Motor Trucks and Trailers;" chairman, George H. Pride, president, Heavy Haulage Company of New York City.

Report of national committee on "License Fees and Motor Vehicle Taxation;" chairman, Henry G. Shirley, roads and sanitary engineer, Baltimore county roads and sewerage department.

Report of national committee on "Highway Transport Franchises;" chairman, F. W. Fenn, secretary, National Truck Committee, National Automobile Chamber of Commerce.

Report of national committee on "Highway Transport Clearing Houses;" chairman, Tom Snyder, secretary, National Association of Commercial Haulers, Indianapolis.

The various sessions also will be opened for informal discussion as usual.

Three New Commerce Bodies

Store at Your Home Service; Bus Body Designed for Centralized Schools, Country Clubs, Hotels; Chemical and Hose Fire Equipment, All Mounted on Model "T" Chassis.

THE Commerce Motor Car Co., Detroit, has added to its line of bodies suitable for mounting on the Model "T" chassis three styles, each designed for different service. The increasing popularity of the "Store at your Home" delivery system has created a market for a new type of body in which it is possible to carry a large variety of stock such as the busy housewife is sure to want from day to day.

THE stock is neatly arranged in bins along the sides of the truck on the interior and it is only necessary for the purchaser to step in the rear door, choose what is desired and settle with the driver. This type of delivery signifies as its name implies. "Store at your Home" service with all of the conveniences found in the up-to-date market or grocery.

The body is handsomely finished in Commerce Brown with "Store at Your Home" in gold lettering on the side panels, with the chassis finished in gray. The body is 5½ feet wide, 72 inches high inside, allowing sufficient headroom for a tall person to stand erect.

There is a tier of four eight-inch shelves on each side, and a series of 15-inch bins for storing sugar,



"Store-at-Your-Door" Body Arranged to Give Plenty of Light and Easy Entrance.

potatoes, flour, etc. The aisle is 30 inches wide and the body 9¼ feet long. The rear door is 26 inches wide, while two rear steps, provided with a hand rail at the side, give easy entrance to the body.

Two dome electric lights supply sufficient light for night delivery while windows above shelving give ample light for day service. A comfortable seat is provided for the driver with a clear vision, ventilating windshield, and storm curtains fitted at the front and sides of the driver's seat. A refrigerator is supplied as optional equipment in-

stalled with drain pipe which extends through the floor of the truck.

Cost of Operation Economical.

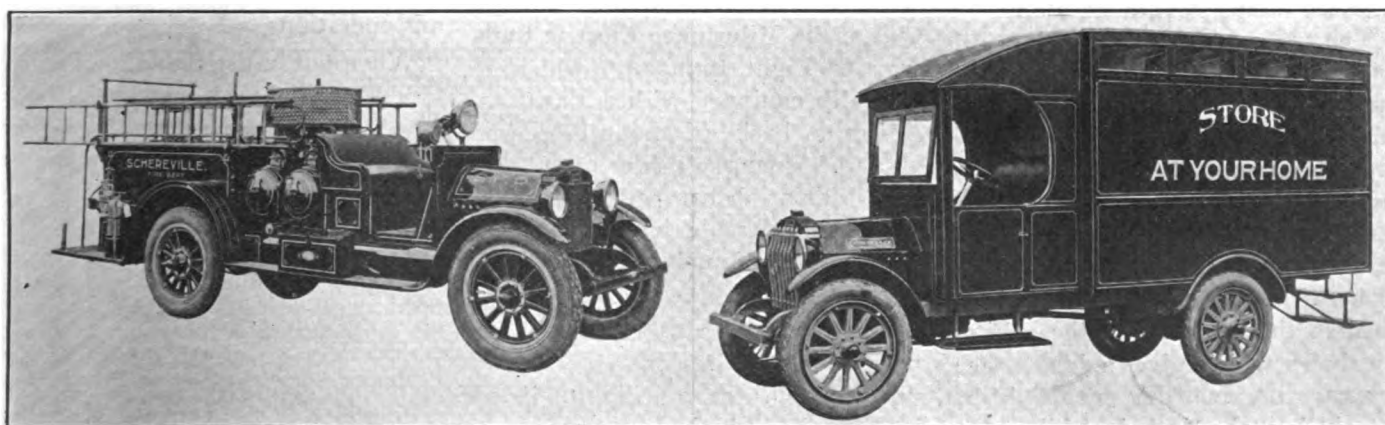
It is stated that the cost of operation is extremely economical with the Model "T" Commerce chassis, as approximately 14 miles to the gallon of gasoline can be obtained.

Commerce Bus Body.

The Commerce Bus, designed for mounting on the model "T" Commerce chassis, has a pay load capacity of 13 adult persons or 20 children. As a jitney, school bus, country club bus, or in hotel transfer service this bus will fit in admirably as it is designed with rugged construction throughout, painted in Commerce royal blue with commerce gray chassis.

The windows are easily lowered into the sills out of sight and furnish ample light and ventilation. A ventilated windshield is placed in front of the driver while side windows provide sufficient light for driving purposes. The seats are very comfortable, being upholstered in Spanish Pantasote leather, with the cushions 17 inches wide.

The body is 12 feet long by five feet seven inches wide and is 66 inches high at the center. The center aisle is 23¼ inches wide providing ample room for passengers



Commerce Bodies Are Built with the Same Attention to Detail That Is Characteristic of the Substantial Trucks Put Out by This Pioneer Company. Good Design Is Also a Feature of These Fine Jobs.

entering or leaving the bus, transfer of trunks, etc.

The front door is of the folding type operated by the driver from the driver's seat, while steps in front, with rear door and steps, provide easy entrance or exit. A driver's window and grilled floor is also provided.

It is stated that approximately 14 miles to the gallon may be obtained with the Commerce Bus body mounted on a Commerce Model "T" chassis; that the bus is completely equipped with all necessary appliances for bus service, and that a speed of 40 miles per hour is possible with the final gear ratio of the chassis on high.

Chemical and House Equipment.

To meet the demand of city, town and village fire departments, the Commerce Motor Car Company have recently designed and placed in production a Combination Chemical and Hose body designed for mounting on the Commerce Model "T" chassis. The equipment of this body is unusually complete and leaves very little to be desired in the line of extra equipment.

Two standard, patented, Obenchain-Boyer 35 gallon capacity chemical tanks occupy a central position back of the driver's seat while 150 feet of $\frac{3}{4}$ -inch chemical hose is contained in a wire basket above. Ladder supports at the sides of the body carry sufficient ladders for all ordinary service. The body carrying space is of sufficient capacity to carry 600 feet of double jacket fire hose. The hose body is of steel construction on the outside with wood slats inside.

Rear Steps Width of Body.

The rear step extends the full width of the body and is well braced to the body sills forming a strong, rugged step which will not sag with use. Nozzle posts are fitted at the corners of the posts while the step is extended at either side to form supports for hand extinguishers. A brass hand rail is fastened to the step and to the side of the body which gives added space for carrying men. A spot light is attached to the dash in addition to the two driving lights.



Department of Public Works, Detroit, Has Found That Truck Equipment Which Exactly Fits the Job Quickly Pays for Itself.

Specially Equipped for Emergency

THE Department of Public Works of the City of Detroit is using a Packard six-ton model "E" truck, fitted with special cab and body especially adapted to the work. The specially constructed cab has seats arranged for eight men, and between the front cab or driver's compartment, and the rear cab compartment, is a large tool box for carrying the necessary road carrying tools. Behind the cab is mounted the special dump body, which is equipped with two swinging partitions, which divide the body into three compartments, so that sand, cement and gravel can be carried separately.

THE body is mounted over a model "D" heavy duty horizontal hydraulic hoist manufactured by the Horizontal Hydraulic Hoist Company, 35 Twenty-Fifth street, Milwaukee, Wis.

The chassis is equipped with a draw bar for hauling the fire pot. The primary object of the complete unit is to carry men, tools and material quickly for emergency repair jobs.

Another Packard truck equipped with horizontal dumping unit is that of the Milwaukee Electric Railway & Light Company, which is specially equipped with a Bay City jib-crane back of the cab, power operated from the power of the engine. This job has been in service for a considerable length of time, and has been found useful in many ways.

The crane is capable of picking up and loading into the body heavy units, which are quickly unloaded by dumping. This is a rather unusual truck equipment and indus-

trial concerns will no doubt find it interesting as showing the possibilities of special truck equipment for special service.

As will be noticed from the illustration, the front end of the truck is equipped for snow plow attaching, operated by a large hand wheel from the driver's seat. The levers and special equipment used in operating the crane are located at the side as shown and easily control all operations of the crane, which can be made to cover a wide field of lifting operations.

When not in use the crane is positioned parallel with the chassis body and fastened, preventing the boom from swinging or doing damage to passing vehicles.

R. A. Schaaf, engineer in the spring division of the Sheldon Axle & Spring Company, Wilkes-Barre, Pa., has severed his connection with that organization to become manager of the Spring Service Company, Scranton, Pa.

Herman Stoll has accepted a position as designer with the General Motors Corporation, Detroit.

FOLLOWING THE HORSEBACK TRAILS

(By GEO. A. PETRUCELLI.)

A NARROW escape from being snowbound, almost being buried in a landslide and constant danger of falling off precipitous cliffs during the night were a few of the thrills experienced by J. H. Blake of the International Motor Company, who recently drove a Mack Year Round Farm Truck through several states of the comparatively undeveloped West. The purpose of this trip, which is believed to be the first of its kind ever made, was to demonstrate to the American farmer the ability of a farm motor truck to operate under the most unfavorable conditions and also to acquaint him with the advantages that can be derived from a motor truck which through its flexibility and versatility can greatly aid him to increase his scope of production and broaden his market radius. At the same time the trip served particularly well as a test of the equipment in the interest of the engineers of the International Motor Company, who designed the truck.

SOME conception of the extreme abuse to which the truck was subjected and the obstacles which had to be overcome on its 3000-mile journey can be gained from the accompanying photographs.

The truck started on its tour from Chicago and traveled westward, passing through the states of Illinois, Iowa, Minnesota, South Dakota, Wyoming, Montana and Idaho. Occasional halts were made to exhibit the truck at several state fairs and agricultural expositions, where it was enthusiastically greeted by farmers from surrounding districts.

Roads Good in Illinois.

Very little difficulty was experienced in traveling through Illinois, Iowa and Minnesota. Except for a few detours the roads were generally good. But when the truck reached South Dakota many obstacles were encountered. Seven days

of heavy rainfall had changed the dirt roads into mud—the famous gumbo mud of South Dakota, that is noted for its excessive sticking qualities, and through which it is



Plowing Along Through Some of South Dakota's Ill-Famed "Gumbo" Mud.

hardly possible to drive a team and wagon. However, the truck forced its way through the mud, making headway slowly. Obviously, the



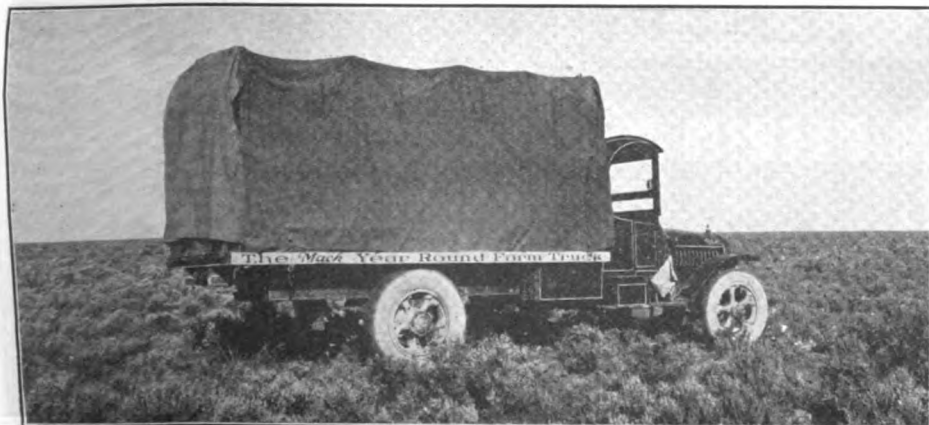
Making a Sharp Turn at the Edge of a Deep Gorge in the Rocky Mountains.

strain imposed upon the truck by this kind of traveling was terrific and it is surprising that the vehicle survived the trip.

Truck Displays Reserve Power.

When crossing the Missouri river at Pierre, an incident occurred that brought into play all of the farm truck's reserve power and which revealed the truck's ability to operate under severe conditions. As there was no bridge at this point save that used by the railroad, the truck was compelled to cross the river on an old stern-wheel ferryboat. To board this boat the truck had to descend a steep bank down to the shore as there were no docks at which to land. The ascent on the other side was rendered more difficult and hazardous on account of the soft soil, which prevented the wheels of the truck from gaining proper traction. The rise was so abrupt that had the truck started to slide backward it would have meant a serious, if not fatal accident—but it surmounted the obstacle with ease.

From Fort Pierre the farm truck proceeded southwest to the Custer Battlefield Highway. Due to the heavy rainfall, in some spots it was almost impossible to keep moving, and it was often necessary to cross ditches and drive through fields, or to let one side of the truck progress slowly through the soft mud at the fringe of the road. It was practically out of the question to keep all



Black Desert, Idaho; a Sea of Sage and Sand—the Only Guide a Compass.

four wheels on the highway simultaneously.

Through Black Hills at Night.

The journey through the Black Hills was accomplished at night. On this part of the voyage the truck experienced some of the severest tests of the entire itinerary. In some places, landslides had obstructed the road. It, therefore, became necessary, even though the truck at the time was pulling up a steep grade, to drive in quick jerks back and forth in order to pass through the soft shaley soil.

After a short stay at Billings,

Montana, the truck continued southwest to Yellowstone National Park. Upon leaving Yellowstone Park the truck was caught out in a terrific snow storm, and to escape being snow bound had to travel throughout the night over treacherous roads, filled with pot-holes and ruts. In some instances, it was driven for miles along the edge of deep canyons due to the many washouts that had completely obliterated the roadway. After driving through the Snake River Valley, stopping occasionally at small towns to give demonstrations, and having tra-

versed the Black Desert, visiting its scattered settlements, the farm truck eventually arrived at Boise, Idaho—the end of the journey.

Travels Distance of 3,000 Miles.

The truck had traveled an approximate distance of 3,000 miles, the most difficult part of which was through South Dakota, Wyoming, Montana and Idaho. This interval, which amounted to about 1,700 miles was negotiated in eight days and nine nights—the average driving day being 19 hours, and a day's mileage from 80 to 300 miles.

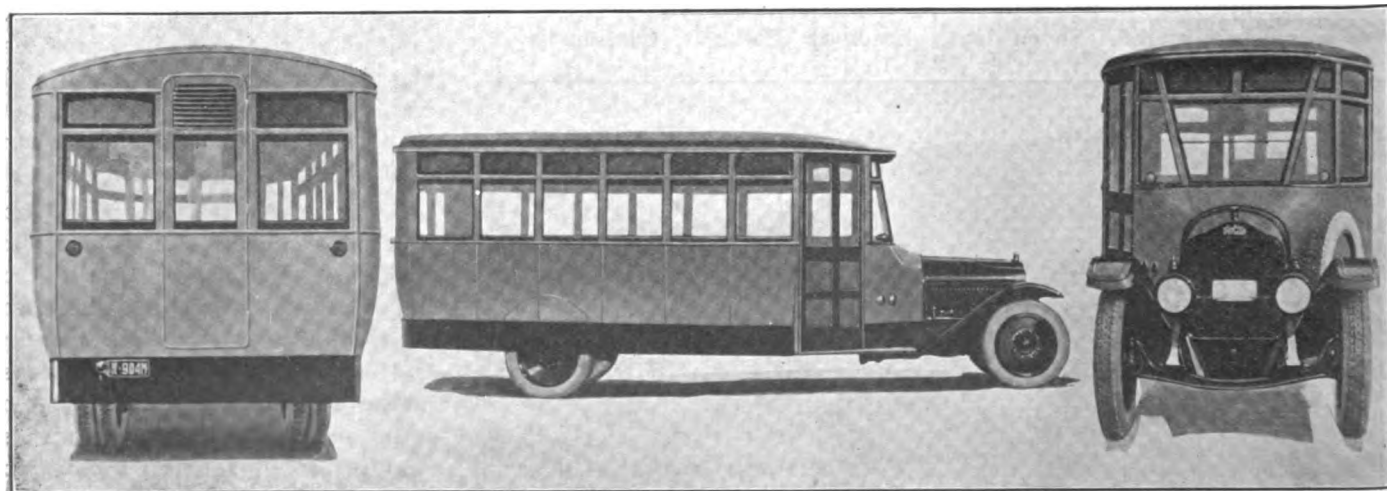
ANNOUNCES TWO NEW BODY DESIGNS

TO meet a large and growing demand, the Weatherproof Body Corporation, Corunna, Mich., is manufacturing two sizes of school bus bodies; one 12 feet long, with capacity of 16 adult persons, and another 14 feet long, with a capacity of 20 adult persons. Keeping in mind that the so-called school bus should be a vehicle for the safe transportation of school children and should in addition be capable of performing other duties when desired, the company has built its bodies very strongly of hard wood throughout, with front doors on both sides operated by the driver, windows furnished with either glass or celluloid lights dropping into the body sides. Celluloid lights are said to be superior because of light weight and also because they avoid the danger from

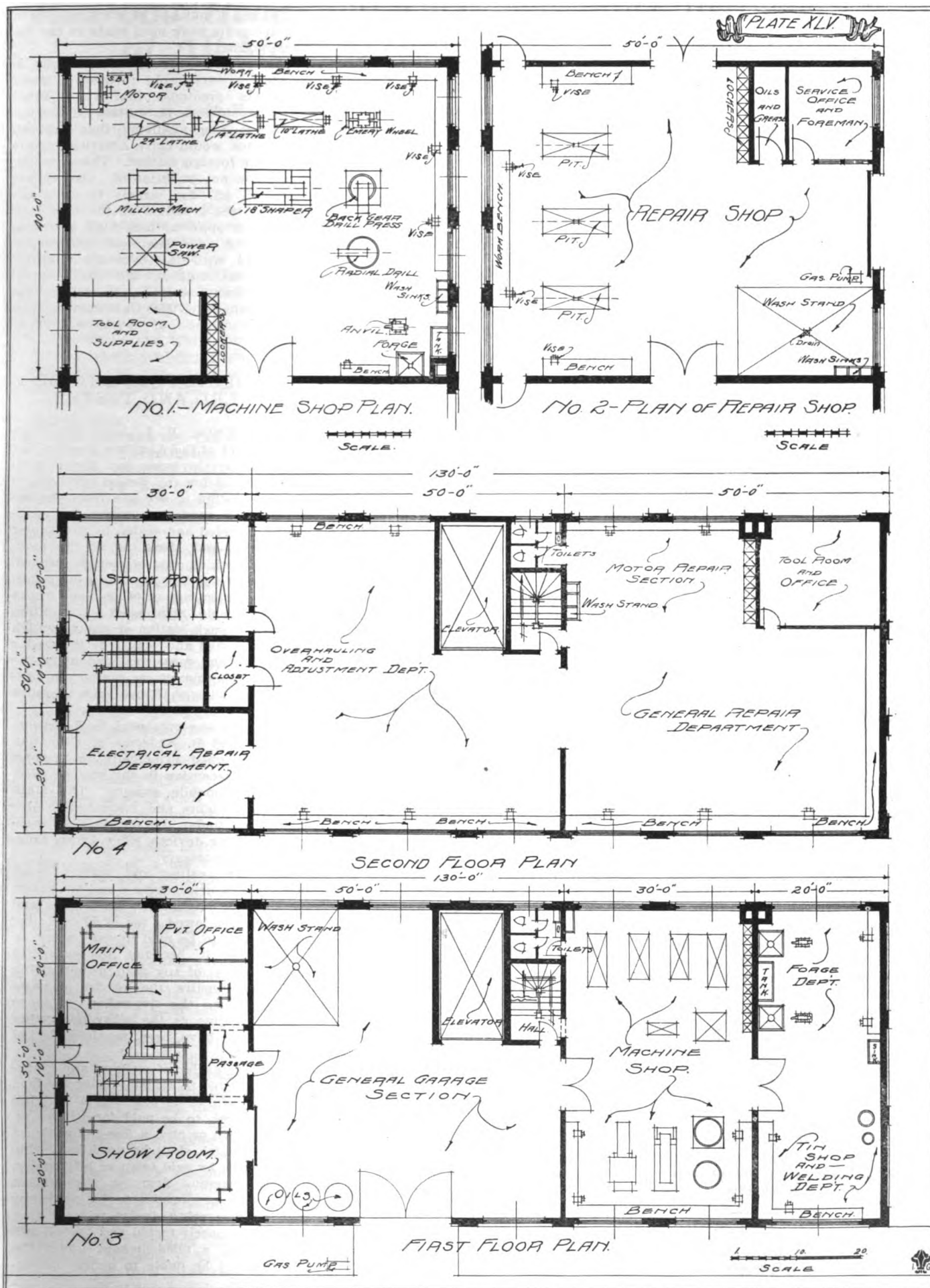
breaking glass in collisions.

The company has also developed a body which is called the Tour-A-Bus. The name is descriptive of its purpose. It is in effect an enlarged touring car, built in two sizes to carry 14 or 25 passengers. It is intended for mounting on a suitable chassis of sufficient strength and speed. This body is fitted with rows of seats extending clear across the body, with doors on one side only, for each seat. It is fitted with a permanent deck, and the sides are enclosed with "weatherproof" sliding py-ra-lin doors. They can be used when needed for complete protection from cold and storm. This style of body is in demand for touring by large parties and is also valuable for metropolitan jitney service. It is practical, light and inexpensive.

The "Weatherproof," twenty-five passenger interurban bus mounted on a special white chassis recently built by the company is 19 ft. 6 inches long from the windshield to the back. It is fitted with a folding front entrance door. The seats are 34 inches wide and special care has been taken to fit them with superior cushions with the idea that passengers should ride in the greatest comfort. This body is equipped with pullman curtains, dome lights, push buttons, heating pipe ventilators and every refinement required by modern motor-bus long distance travel. The body is built as low as possible to preserve absolute road clearance. No effort or expense has been spared in the finish of both the interior and exterior and the result is an especially attractive job.



Type of "Weatherproof" School Bodies That Are Meeting Demand for Low Hung, Well Balanced Job.



Motor Truck Sales and Service Stations, Showing How Various Departments May Be Arranged to Facilitate Service.

Will Represent Standard Truck in New England Territory

C. J. Fischer, Well Known in Motor Transport Field, Severs Connection with Brockway and Accepts Responsible Post with Detroit Manufacturer.

DETROIT, APR. 13.—C. J. Fischer, formerly manager of the Brockway Motor Truck, Boston branch, is now representing the Standard Motor Truck Company in the New England states.

Mr. Fischer states that he selected Standard trucks because the standardized quality construction is becoming recognized as the ideal type of truck, from not only a service, but also sales viewpoint.

"With the establishment of direct local new parts depots, the Standard dealer is able to devote his financial efforts to sales. He is also able to render better service than formerly," says Mr. Fischer.

Among recent dealer franchises closed by Mr. Fischer during the past week, were the territory covered by Stamford, Conn., and Hartford, Conn. Mr. Fischer is making his headquarters with the Standard Boston Distributor.

ENGINEERS WILL TEST RAILWAY BUSES.

NEW YORK, April 14.—Members of the Society of Automotive Engineers will journey to Yale University in gasoline propelled railroad cars through the co-operation of the New York, New Haven & Hartford Railroad. These new cars are part of an initial order which the New Haven has recently placed in service on some of its branch lines. The cars represent the entry of the automotive industry into the railroad equipment business, and this trip will be the first in history in which a scientific body has made a trip of any distance on a standard railroad in a motor rail car.

President E. J. Pearson of the New Haven road is enthusiastic over the new cars, which he says can be operated for a fraction of the cost of steam equipment on branch lines where the traffic is light and on which the public nevertheless demands comfortable, fast and frequent service. The International Motor Company of New York, which built these cars, will supply Mack motor busses to transport the party from the S. A. E. headquarters in New York to the Harlem river terminal of the railroad, from which the rail cars will start.

The meeting at Yale University is to hear a scientific paper by Prof. Lockwood of Sheffield Scientific School on power losses in motor vehicle chassis.

William G. Clark has accepted a position as engineer in the gas engine department of the Pure Oil Company, Minneapolis.

MOTOR BUS TRIPS IN GREAT BRITAIN.

LONDON, APR. 1 (By Mail)—"Travel by Road" Bureau issues every month a motor bus time table and char-a-banc guide for England and Wales, showing that at present British travelers may make a selection from 1,760 different tours, operated by 255 companies. The guide first appeared in June last, and since then the number of the operative services has increased 25 per cent.

OBJECT TO \$25 FEE LEVIED ON BUSES.

PEORIA, ILL., APR. 13.—Twenty-five dollars is far too much for a bus franchise, say the citizens and owners of busses in this city who have banded together to see if there isn't some way in which the proposed city tax may be either annulled entirely or else made smaller.

It is pointed out that the busses have greatly inconvenienced certain sections of the city and that there should not be any restriction on them at this time while the development is going forward. One rumor that has not been confirmed satisfactorily is to the effect that the street car companies have been responsible for the several difficulties that the busses have had to combat.

WICHITA TRUCK MAKES PRICE REDUCTION.

WICHITA FALLS, TEXAS, April 14.—"In line with the reduction in the prices of materials and with the increased volume of business, it is possible to make a substantial reduction in the prices of our products," states J. G. Culbertson of the Wichita Motors Company.

"The new prices of Wichita trucks are as follows:

Model K, 1 ton chassis, \$1875, a reduction of	\$425
Model M, 2 ton chassis, \$2400, a reduction of	400
Model RX Oil Field Special, \$3200, a reduction of	400
Model G, 4 ton chassis, \$3500, a reduction of	500

"Notwithstanding these material price reductions, a number of very important improvements have been made in the various models.

"The export trade in motor trucks is showing a very rapid recovery. Many pessimists predicted that the United States would lose its volume of foreign trade. It was predicted that German competition would drive American goods out of the foreign market. These predictions have not materialized. Our export trade fell off, due largely to exchange rates and the premium on the American dollar. In spite of this high premium we enjoy a good share of the world's trade and with the constant improvement in exchange we will find a corresponding increase in our overseas commerce," concludes Mr. Culbertson's optimistic forecast of business conditions.

GASOLINE PUMPS TO BE SEALED AND TESTED.

PROVIDENCE, R. I., April 10.—With the approval of the Andrews gasoline act yesterday by Governor San Souci, it is now unlawful for any person operating a gasoline station to sell gas from the ordinary tank apparatus unless the same has been tested and sealed by the Sealer of Weights and Measures of the town or city in which said station is located.

All persons selling gasoline from a gasoline station, garage or other place where gasoline is sold, must keep a five-gallon measure in such station or garage which has been tested and sealed by the sealer of weights and measures, and upon the request of any purchaser the person selling the gasoline shall use such measure instead of the pump.

Bill H 880 was presented by Representative Harold B. Andrews of Cranston, and is designed principally to prevent fraud and deception in the sale of gasoline to automobile owners. The state sealer of weights and measures is also empowered under the act to test gasoline-measuring devices, when, in his judgment, it is necessary.

From the testing and sealing of all gasoline-measuring devices and measures, the town or city sealer of weights and measures is allowed a fee of 50 cents for each device, to be paid by the owner.

Whenever it becomes necessary to break the seal of any gasoline-measuring device for repairs, the vendor of gasoline shall use the five-gallon measure until such time as the other measuring device shall have been repaired, tested and sealed.

The state sealer of weights and measures is directed to furnish, under the law, to each town or city sealer of weights and measures, to be paid for by the respective town or city, a five-gallon liquid measure, which shall be used in testing all measures by said town or city sealer.

Every person, firm or corporation which uses or permits to be used any gasoline measuring device without first having it properly tested and sealed, will be guilty of a misdemeanor under the law and will be liable to a fine not exceeding \$50.

Railroad Head Favors Supervision of All Motor Truck Lines

J. H. Hustis of B. & M. Railroad in Annual Report Urges Measure, Stating That Motor Competition Has Reduced Rail Travel to Vanishing Point.

BOSTON, APR. 12.—Motor-Truck lines should be brought within supervision of the Interstate Commerce Commission and the State Public Service Departments, according to the ideas of President J. H. Hustis of the Boston & Maine Railroad, whose annual report was made public yesterday.

Automobile and truck competition are factors which are being given serious consideration by the management of the road, it is stated, and the former may make it necessary to abandon several branch lines.

After pointing out the saving accomplished, by discontinuing the Profile and Waumbek branches in New Hampshire last year, on each of which "automobile competition had reduced railroad travel to a negligible quantity," the report continues in part:

"There are several branch lines on which the business has been affected by automobile traffic to an extent which raises a question as to the necessity of continuing operation, but each case requires and is receiving careful consideration.

A comprehensive study of the motor-truck situation had been under way for some time to determine to what extent the company can act in coordinating truck and rail transportation so that each may properly and profitably operate for the maximum convenience and economy of the shipping public.

"Effort is being made to enlighten public interest in the economic change brought about by the building up of this new transportation agency. It is hoped that the time is not far distant when the trucks will be required to pay their fair share of the cost of highway construction and maintenance and when truck lines will be subject to the supervision of the Interstate Commerce Commission and the State regulatory bodies."

As a preface to considering the road's \$7,000,000 deficit last year, Mr. Hustis discusses in general the results during 1921, the first full year of its operation, of the Transportation Act of 1920. These results have been disappointing, he states.

"The public is dissatisfied because of high rates and restricted service. Labor is aggrieved because the process of economic readjustment is bringing about a scaling down in war-time rates and modifications in war-time working rules. Stockholders are discouraged because the diminished net income has in many cases necessitated a reduction in or suspension of dividend payments.

"Instead of earning six per cent. in 1921, the railroads as a whole were able to earn but little more than one-half of that rate."

At present the business situation shows signs of improvements and any downward turn in expenses and improvement in traffic is expected to be reflected in lower operating ratios, it is pointed out.

"While inevitably there will be rate readjustments, it should be borne in mind that as during the war railroad rates and wages generally lagged behind those in industry, so it is inevitable that they will lag behind in the return to pre-war conditions."

In regard to the Boston & Maine in particular, Mr. Hustis states that the road was confronted with a marked falling off in traffic. The result of actual operations for 1921, after taxes, equipment and joint facility rents and fixed charges were paid, was a deficit of \$7,348,086. This represents a decrease of \$9,784,395 from the preceding year.

Discussing economies effected he states that the number of employees was reduced from a maximum of 34,138 in September, 1920, to 26,161 in May, 1921. He continues:

"Labor is, of course, the biggest item of expense, but in this field the opportunities for economy have been limited.

TWO TOLL BRIDGES PASS TO STATE.

THE bridges spanning the Delaware River at Washington's Crossing and Milford are to be taken over by New Jersey and Pennsylvania under a decision of the Joint Commission on Interstate Bridges. The Washington's Crossing span will cost the two States \$40,000 and the Milford bridge \$31,500. The commission has also decided to acquire the Yardley bridge for \$67,000 as soon as a clear title can be obtained.

The freeing of the structures from tolls will be expedited after the legal questions affecting title transfers have been settled by the Attorney Generals of the two States.

The labor provisions of the Transportation Act, designed to prevent interruption of transportation, have necessarily acted as a brake on the process of readjustment of wages and working conditions. A reduction in basic wages was granted July 1, 1921 which, on the Boston and Maine, averaged over 11 per cent.

"The freight business and passenger business, which had reached a high record in 1920, fell off in 1921 to an extent never before experienced in the history of the railroad as between one year and another. The revenue ton miles in 1921 amounted to 2,673,769,008, as compared with 3,705,528,286 in 1920, a decrease of 27.8 per cent.

Steel Cars for Through Trains

"Although freight rates and passenger fares were increased during this period, these increases, with the large reduction in traffic, did not produce sufficient revenues to keep pace with the increase in operating costs. The total revenues for 1921 were \$78,289,750 or 41 per cent. more than the revenues of 1916, amounting to \$55,383,545. But the operating expenses in 1921 were \$73,833,472 or 93 per cent. more than the expenses of 1916, amounting to \$38,251,716. Taxes for 1921 show an increase of \$577,335 or 27 per cent. over 1916."

Physical valuation of the road under the Act of 1913 has been nearly completed, it is stated, tentative figures giving the cost of reproduction new of the property as of June 30, 1914, as \$282,431,214 as compared with the book value of \$214,465,148 the same date. It has cost over \$1,000,000 to prepare this data.

As many through trains as possible are to be equipped with steel cars, it is announced. Mr. Hustis refers to but does not comment upon the proposals of the Interstate Commerce Commission for consolidation of railroads into certain units.

HAS PLAN TO HELP TRAFFIC CONDITIONS.

BOSTON, APR. 13.—As a means of relieving the highways of the country from congestions caused by motor truck traffic and also to bring about still greater efficiency in the movement of goods, George J. Bicknell, a Boston business man who has given the subject great consideration, suggests a plan whereby the railroads of the country shall widen their roadbeds each side of their outside tracks, building thereon thoroughfares of proper material which can be devoted to the exclusive use of motor trucks.

Mr. Bicknell feels that this is not only a safe but a sane way of bringing the railroad and the transportation of goods by motors in closer affiliation. These avenues could be used for merchandise hauling and should be opened to all privately owned autos and expresses which, in conjunction with the railroads, should pay for the privileges of using the roads without prejudice; the charge being sufficient to pay the cost of investment and maintenance and allow a profit to be determined by a railroad commission.

Four More States Join Ranks of Gasoline Tax Enforcers

Fuel Fees Legalized by 18 Legislatures—Bills Pending in Others—Lawmakers Said to Favor Plan Calling It Handy and Easy Source of Revenue.

NEW YORK, APR. 13.—Of the eleven States whose Legislatures have convened this year or are still in session, four have enacted a gasoline tax. They are Maryland, Louisiana, South Carolina and Mississippi. Bills for a gasoline tax are still pending in Massachusetts and Rhode Island. In all of these cases, as has hitherto been the custom, the gasoline tax has been enacted in addition to the customary motor vehicle registry and general license fees. The gasoline tax in these four states is one cent a gallon.

These recent additions give a total of 18 States in the Union which collect fees on gasoline purchased within their borders. The 14 which had the law last year are Arizona, Arkansas, Colorado, Connecticut, Florida, Georgia, Kentucky, Montana, New Mexico, North Carolina, Oregon, Pennsylvania, South Dakota and Washington. The rate in every case is one cent a gallon, except in Oregon, where the fee is two cents. A gasoline fee bill, it will be remembered, was introduced into the recent New York Legislature, but in view of the fact that registry fees were materially increased on both passenger cars and trucks no serious effort was made to pass it.

The gasoline system of motor taxation is gaining favor from the lawmakers as a handy source of revenue getting from motorists. Logically it has many factors in its favor, and motorists are by no means averse to it, provided it is fairly enacted so as not to become a supertax upon motor users. Commissioner Law, head of the New York Tax Commission, in speaking of its advantages early in the year, took the view that if the gasoline tax were the only motor vehicle tax imposed by the State it would be the fairest system of motor taxation.

Motorists and truck owners are said to be generally in accord with the Commissioner in this view, but the difficulty thus far lies with the legislators, who, while enacting the gasoline tax, fail to lessen in any degree the former annual fees based upon horse power or weight. The opposition, therefore, to the tax is that it is imposed as an extra burden upon the motor-using public and solely with the object of obtaining more revenue. With a fair gasoline tax, motor car users would pay according to the extent of their automobile usage. The man who uses his car or truck but a short period would pay a smaller amount than the man who keeps his vehicle in use practically the entire year.

Under the present system every one pays the same proportionate registry fee. Instead of exacting the full annual fees, some States allow a half-year fee.

This is the case in New York, provided the application is filed for a new car between July 1 and the end of that year.

A FEW DON'TS.

DON'T fail to blow your horn and slow down ready to stop at a blind corner. It's for your safety as well as the other fellow's.

Don't fail to blow your horn and slow down ready to stop when you see children playing on the sidewalk or near the roadway, or when you are passing close to machines drawn up near the curb, where people are likely to step out unawares.

Don't neglect to blow your horn at all crossings.

Don't attempt to pass another vehicle going in the same direction unless you can see clearly for a reasonable distance down the road. This is especially important when nearing a curve or approaching the top of a hill.

Don't take chances. Give the other fellow the road if he wants it.

Don't make the other fellow think you want all the road. He may need it.

Don't drive fast through busy streets.

Don't disregard the rights of others on the highway. Remember, courtesy is as proper on the road as in the drawing room.

Don't stop suddenly or back up without signaling and looking.

Don't try to drive in behind another fellow who is trying to back into a space by the curb. He may keep on backing and anyway, somebody who knows you is likely to see you playing the hog. It may be clever to get there first, but it is not good manners.

Don't blind others with over brilliant lights. Just because there is a headlight law in your state and the authorities haven't caught you, don't think the amateur driver—or experienced chauffeur—who is coming toward you won't do some sort of flip-flop which will involve you in a bad mix-up, if he can't see where he is going.

Don't think your horn is heard. Some jay walkers wouldn't hear a fire engine.

Don't think the approaching train at a grade crossing is a freight. Sometimes it isn't.

—Linscott Reo-Gram.

To register an old or used car for the half fee an affidavit is required showing that it has never before been registered in the State. Connecticut and Rhode Island, and perhaps other states, on the other hand, have a more equitable law. The motor year begins Jan. 1, but all cars registered after April 1 pay a lower fee for every remaining month of the year, according to the time of registry.

It is interesting to note that of the States having a gasoline tax, the only one where it met with general favor among motorists was Maryland, and that, too, without any change in the usual motor car fees. The gasoline tax there goes into effect June 1. It is estimated that in the seven months from that time to Dec. 31 about \$1,180,000 will be raised from gasoline sales. Approximately half of the sum will be devoted to removing a deficiency in the maintenance and reconstruction fund of the State Road Commission. The other half will be used for the construction of State roads through incorporated towns and cities to connect the State's arterial system of roads. There is also pending in the Maryland Legislature a two-cent gasoline tax bill. It has passed the House and is expected to pass the Senate. This act will go into effect Jan. 1, 1924, and the revenue obtained will take the place of the existing motor horse power registry tax, the money to be applied for the maintenance and construction of roads. If this bill is adopted and signed, the one-cent gasoline act will cease on Jan. 1, 1924. According to the arrangements, motorists in Maryland will, after Jan. 1, 1924, pay practically nothing more than a two-cent a gallon gasoline tax as their State motor fee, although a small charge, it is understood, will be made for the annual registry and plate numbers. Of all the gasoline motor bills thus far enacted, the plan worked out in Maryland seems to be the most just.

BUS SUPPLY STATIONS FOR SOUTHERN CITY.

RICHMOND, VA., April 14.—The State Corporation Commission has been requested to give a charter to some 220 stockholders of a new organization designed to establish bus supply and service depots in this city. It is understood that the charter will be granted within the next few weeks, following which the work of establishing the stations will go forward.

The fundamental reason for the formation of the company is to protect the bus business from restrictive taxes and legislation and there is every reason to believe that much good will result from the plan which is sponsored by many of the city's prominent business men.

It is also probable that within the very near future a uniform schedule of fares will be put into effect, though there has been nothing tangible done as yet.

Regular routings for the busses of the corporation will be arranged within a few days it is stated, following which the attempt to establish a uniform fare will be given attention.

Motor Transport Requires Services of Trained Executives

F. W. Fenn, N. A. C. C. Official in Speech at Massachusetts Institute of Technology Tells of Opportunities Awaiting Entrants Into New Field.

BOSTON, APR. 14.—"In the next 10 years 4,000 specially trained men will be needed for service in the highway transport business," declared F. W. Fenn, secretary, national motor truck committee, National Automobile Chamber of Commerce, today in an address before the students and faculty of Massachusetts Institute of Technology.

Mr. Fenn said in part:

"The whole field of the highway transport is practically virgin. It welcomes the entrance of trained men. Men of the very highest professional ability are daily turning to it; only recently a former governor entered the field.

"The success of the experiment in allocating to motor trucks the interchange of freight among the eight railroads entering Cincinnati, which has resulted in eliminating 300,000 switching cuts, is going to mean its duplication in every major terminal center.

"It is fairly certain that the next great development in this country in transportation will be therefore a national delivery service for picking up traffic at the point of origin and making delivery at the store door of the consignee. The motor truck offers the best solution of this problem in the opinion of many railroad officials. Only this past month the transportation of freight between the New Jersey rail terminals of the Erie railroad and New York City has been affected by means of trucks.

"It is now an established fact that motor truck operation can be substituted for short branch-line railway operation, trap car service, suburban railroad and terminal distribution. The New York, New Haven and Hartford Railroad, the Baltimore & Ohio and the Northern Pacific, are already using trucks with flanged wheels on short branch-line operations."

Mr. Fenn called attention to the fact that the committee on the development of the motor bus of the New England Street Railway Club recommended at its last monthly meeting that in many instances it would be preferable to install motor bus service instead of trackless trolley equipment. This was felt by the speaker to be the logical development in urban passenger transportation. There are now 20,000 motor busses servicing the congested and undeveloped areas of our principal cities.

It was also pointed out that approximately 75 per cent. of the hauling in the Texas and Oklahoma oil fields is carried on by means of specially designed truck and trailer combinations. Mr. Fenn said that "there is no question but that the motor truck is a very important part of the operator's equipment

MOTOR VEHICLES HELP TO SPREAD EDUCATION.

MOTOR cars and motor trucks are being used by many colleges for extension courses and for general purposes. Amherst, Dartmouth, Williams, Massachusetts Institute of Technology, Carnegie Institute of Technology, University of Michigan, Cornell, Harvard, Vassar, Wellesley, Columbia and Johns Hopkins are among the institutions having motor transportation equipment.

in the production of petroleum. The impressive sizes to which the truck fleets of some of the largest oil companies in the world have grown during the past few years is a striking confirmation of this assumption.

"There is every reason to believe also that in the transportation of coal and other mine products from the mouth of mines there will be from now on a marked tendency to utilize power trucks. Just how extensive this movement will be may perhaps be judged from the fact that the products of approximately 3,200 mines are being carried by either motor truck or wagons at present.

"Just a short time ago the opinion was ventured by several prominent lumbermen that within the next three years all mules and oxen now in use in Southern lumbering will be replaced by tractors and trucks. Various methods of transportation have been employed from time to time in the handling of our forest products; but in the last few years lumbermen in general have displayed a keenness for inquiry and observation that has resulted in the development and use of many new devices, especially trucks, intended to save both time and money for lumber producers."

BUS AIDS CITY WORKERS IN WORCESTER.

WORCESTER, MASS., April 13.—Something over a year ago the housing situation in Worcester became particu-

larly acute, and steps were taken to build up the outlying districts as this seemed to be the only solution of a problem that was causing the city officials much concern.

With this in view the authorities got into communication with the street car company and asked that the tracks be run out into the outlying districts in order that some sort of car service might be established. But they were unsuccessful, it is stated, and for a time believed that they would be unable to carry out their original plan.

Finally, however, the situation was solved by a jitney operator who with the assistance of real estate owners started a taxi line which extended more than three miles beyond the end of the car lines.

The new district was very slow in building up and there was not enough traffic to warrant the use of more than one bus at the start-off, but within a short time the real estate owner, realizing that the transportation problem had been solved, started in to erect suitable dwellings and today the district has a total of nearly 150 houses, the entire development being directly traceable to the efficiency of the modern gasoline bus.

These busses, of which there are several, at the present time are all operating at very fair profit to the owners and there is every reason to believe that within a year the number will have doubled if the present system of building is kept up. "So much for the efficiency of the modern bus," comments the writer who forwarded the foregoing.

PAUL ST. ELMO WEBB JOINS HINKLEY MOTORS.

DETROIT, APR. 14.—Sales Manager Charles A. Neville of Hinckley Motors, Incorporated, announces the addition to the Company's organization of Paul St. Elmo Webb as sales promotion manager.

Mr. Webb's experience has covered a broad range of service in the field of heavy duty transportation, both as an executive of sales and service and as a transportation engineer with the Diamond T Truck Company of Nashville, Tenn.

In his new position Mr. Webb will pay close attention to the application of Hinckley-Engined trucks and busses to the various transportation problems continually arising. He will also work in close touch with dealers and distributors of Hinckley-Engined vehicles desiring data, information and counsel.

E. Tasso Morgan has accepted a position as junior engineer for Arthur Andersen & Company, Chicago.

John E. Pfeffer has a position as mechanical engineer with the Continental Engine Company, Chicago.

The transfer of E. B. Neil, who was mechanical engineer in the sales engineering division of the Pierce Arrow Motor Car Company, Buffalo, to the service of the Harrolds Motor Car Company, New York City, local representative of the Pierce-Arrow organization, is announced.

American Gear Manufacturers Will Meet in Buffalo April 20

Sixth Annual Meeting of Association Promises to Be Interesting and Instructive—Special Attention to Be Paid to Trade Conditions.

BUFFALO, N. Y., April 14.—The sixth annual meeting of the American Gear Manufacturers' Association will be held April 20, 21 and 22 at the Lafayette Hotel, Buffalo, N. Y.

This Association, through a sectional committee, has been giving close cooperation to the American engineers' standards committee, and the report of this and other committees on standardization promises to be of unusual interest.

Special emphasis will be given to business conditions in the gear industry and the outlook for the immediate future.

Among the subjects to be discussed are "Good Hob Practice" by H. F. Harris of the H. E. Harris Engineering Company, "The Use of the Projector Comparator in Testing Gear Teeth," by Ralph E. Flanders of The Jones and Lamson Machine Company; "Proportions of Industrial Gears," by G. E. Katzenmeyer, of the R. D. Nuttall Company; "The Grinding of Gear Teeth and its Future in the Industry," by R. S. Drummond of the Gear Grinding Machine Company; "The Gleason Works System of Bevel Gears," by F. E. McMullen and T. M. Durkan of the Gleason Works, and "Conditions in the Industry," discussed from the standpoint of the industrial member companies under the leadership of George L. Markland, Jr., of Philadelphia Gear Works, and from the automotive standpoint with R. P. Johnson of the Warner Gear Company presiding.

An informal banquet for representatives and guests will be held on Friday evening, April 21, the principal speaker at which will be John C. Bradley of the Pratt and Letchworth Company, Buffalo, N. Y., who will take as his subject, "What's Ahead."

During this meeting four members will be elected to serve on the Executive Committee for a term of three years. The present officers are: President, F. W. Sinram, of the Van Dorn & Dutton Company, Cleveland, O.; First Vice President, R. P. Johnston, Warner Gear Company, Muncie, Ind.; Second Vice President, B. F. Waterman, Brown & Sharpe Company, Providence, R. I.; Secretary and Treasurer, F. D. Hamlin, Earle Gear and Manufacturing Company, Philadelphia, Pa.

WHITE CONTINUES TO SHOW GAIN.

CLEVELAND, O., April 14.—White Motor business continues to improve. The company reports March orders were approximately 20 per cent. higher than any month since May, 1920, and that de-

AMERICAN 'PEP' BLAMED FOR ACCIDENTS.

BERLIN, APRIL 3.—That fact that street accidents in Berlin have increased 600 per cent. since 1913 has led to the suggestion that one of the causes may be the apparent effort to put American "pep" into the city's everyday life. One newspaper writer asserts Berliners have become too busy to greet friends in passing; that the spirit of hustle is disturbing the general routine, and that the citizens on the whole are growing nervous. He deprecates "the attempt to make Berlin street life look like Forty-second street and Broadway."

liveries exceeded any month since September, 1920. The first quarter's business, in both orders and deliveries, shows considerable increase over the corresponding quarter last year.

Loans have been reduced since January 1 to \$3,300,000, with over \$2,500,000 cash on hand, in addition to the dividend payment of \$500,000 on March 31.

Reports from the 40 branches of the company indicate a decided improvement in general business conditions with every prospect for increasing business.

A few of the numerous railroads operating White trucks on rails are the LaCrosse & Southeastern Railroad Company, Minneapolis; Verde Tunnel & Smelter Railroad Company, Clarkdale, Ariz.; Mt. Hood Railway, Hood River, Oregon and the Tennessee Midland Railway, operating between Franklin and Mt. Pleasant, Tenn.

TRANSPORT BOOKLET OPTIMISTIC IN TONE.

MT. PLEASANT, MICH., April 11.—A thorough covering of the motor truck market of today, a guide to the fields of most promising prospects for 1922, and a salesman's manual based on conditions that now confront the industry are all included in a comprehensive volume just completed by Transport Truck Company.

It is a work of unusual importance at this time, as it deals particularly with the situation since the beginning of the period of readjustment. A tremendous dragnet of research was thrown out months ago. The Transport Truck Company added to its resources of connections throughout the states, every channel through which reliable information on conditions and outlook could be obtained. Never before have so many agencies collaborated on a work devoted strictly to motor truck information. In fields where up-to-the-minute statistics were not available, original research has been made, producing first hand information. Altogether it gives a broad and accurate view of the utmost value.

The net result is optimistic. Ample proof is found that the motor truck industry is on a gradual upward curve, the benefits of which will begin to be generally felt before the story of 1922 is completed.

As the book is intended only for distribution among Transport field men and territorial agencies, it particularizes on the Transport's 1922 line of six models and equipment. Here, too, remarkable work has been done by the Transport engineering, production and sales forces. From the Rapid Transport one-ton delivery to the heavy five-ton service specialized construction, capacity and equipment for every form of transportation is thoroughly described and illustrated. Truck salesmen are armed with an answer to every question that can possibly arise.

The Transport text book marks the aggressive activity that will rapidly advance motor transportation to the general adaption needed to put all business on the most efficient and most economical basis of service. The Transport Truck Company is well fitted to produce such a work.

WINTER CAPITALIZED CONSERVATIVELY.

KENOSHA, WIS., April 14.—An erroneous statement is said to have been published regarding the present capitalization of Winther Motors, Incorporated, which that company states presumably started last summer following the consolidation of the Marwin Truck Corporation and the Kenosha Wheel & Axle Company with the Winther Motor Truck Company, under the name of Winther Motors, Incorporated.

Instead of Winther Motors, Incorporated, having been excessively capitalized as has been reported, it has an authorized capital stock of \$1,000,000 preferred stock and 600,000 shares of no par value common stock, about half of which is issued and outstanding. The company states that the consolidation was made purely as a matter of convenience and economy in operation.

Effective March 1, W. H. Sackman resigned his position as chief engineer of the Light Manufacturing & Foundry Company, Pottstown, Pa. He has not announced his plans for the future.

Laws Recently Enacted in New York Impose Truck Limitations

Legislation Specifically States Legal Size, Weight, and Speed of Commercial Vehicle and at Same Time Increases
Registration Fees.

NEW YORK, APR. 13.—An Act recently passed by the state legislature limits size, weight and speed of motor trucks in New York state. Approved April 7, 1922; and effective immediately, it prohibits the operation of motor trucks and trailers having a width of body, including load, of more than eight feet, except that racks for carrying empty barrels, baskets and boxes, and for carrying hay, straw and unthreshed grain, may have a width of not to exceed eight feet at the base of the rack and 12 feet at the top, a greater combined weight of more than 28,000 pounds in the case of four-wheeled vehicles, or a greater weight than 9,800 pounds on one wheel, or the axles closer together than eight feet and the weight on one wheel more than 5,600 pounds, or more than 700 pounds pressure per inch width of tire on any one wheel; and requiring all motor trucks or motor busses to be equipped with a mirror or other reflecting device so adjusted that the operator may clearly observe traffic to the rear of the vehicle.

The weight of the vehicle, allowable load, and gross weight must be legibly shown on the right side of the body or chassis or on the right side of the cab below the driver's seat. Violation is punishable by fine of \$25 or imprisonment for 10 days, or both.

Overloading is made a misdemeanor punishable by fines varying from \$50 to \$250, or imprisonment for from 30 to 120 days, or both, and, in addition, for a third offense, suspension of registration for not less than 30 days nor more than six months. Any overload in excess of five per cent. of the allowable load is to be unloaded on the side of the road or place where vehicle is weighed.

The speed of a motor truck not exceeding two tons capacity is limited to 20 miles per hour; in excess of two tons capacity, 15 miles per hour; but when equipped with pneumatic tires a speed of five miles per hour in excess of these rates is permitted.

The State Commissioner of Highways is empowered to inspect motor vehicles to detect overloading, inadequacy of equipment, and other violations of the motor vehicle law, and also to use the State Police for this purpose.

Another act increasing automobile and motor truck registration fees amends subdivision 6 of Section 282 of the Highway Law, by providing that on and after January 1, 1923, the registration fee for a motor vehicle not exceeding 3500 pounds in weight, fully equipped, shall be 50 cents for each 100 pounds or major fraction; and for a vehicle weighing in excess of 3500 pounds, fully equipped, 75 cents for each 100 pounds. The minimum

fee for a six, eight or 12 cylinder vehicle remains at \$10, but for all others the minimum fee is increased from \$5 to \$8. The manufacturer's weight to be accepted as the weight for purposes of registration. Present fees are based on horse power, age and list price of the vehicle.

This act amends 6-3 of Section 282 of the Highway Law by providing that, on and after January 1, 1923, the registration fees for auto trucks or light delivery cars shall be as follows: Vehicles having a combined weight of truck and carrying capacity of two tons or less, from \$10 to \$15; and for each such vehicle having a combined weight of truck and carrying capacity of more than two tons, \$8 for each ton or fractional part thereof.

OHIO BUS COMPANY PLAN BIG BUSINESS.

NEWARK, O., APR. 12.—The American Motor Truck Company announces that it has received orders from the Ohio Bus Company, of Columbus, for 47 additional busses which will be put into operation over that company's various lines. This bus company, which was organized with a capital of \$600,000, already in successful operation in a fairly large way, plans a marked expansion in the near future and will link up several towns and cities with Columbus, developing regular routes to handle this end of the business.

The new busses, which will be deliv-

ST. LOUIS TRAFFIC FATALITIES IN 1921.

REPORTS in the National Safety News show that automobile fatalities in St. Louis dropped from 192 in 1920 to 97 in 1921. Education in schools is one of the biggest factors in bringing about this improvement.

St. Louis Safety Council also decided upon a safe driver's school, organized 35 leaders of boys to Junior Safety Cadets, sent an individual letter to every automobile driver involved in accident and engaged in many other similar activities.

ered as soon as they can be built, will have several distinct features that the management of the bus company has decided on. They will be 84 inches wide, 28 feet in length and will carry 20 passengers seated. The company believes that crosswise seating is favored by passengers and this method will be used.

The profits of the company as yet are undetermined but there is good reason to believe that it is approaching a highly successful state, which with the proposed expansion makes it a very desirable property.

RAILROAD PROTESTS IN VAIN—BUS COMES.

HAMMONTON, N. J., April 14.—A motor bus line to run between this town and Berlin and Atco was recently put in operation despite the protest of officials of the West Jersey and Seashore railroad who stated that the company would have to take off more trains should such a franchise be granted. It is probable, states a prominent man, that there will be plenty of business for both the railroad and the bus line, during the summer at least, after which it will be a case of the survival of the fittest.

As a matter of fact, the citizens of this community feel that the bus line has been needed for some time, and many have stated their intention of using it.

BUSSES REPLACE STREET CAR LINES.

RED BANK, N. J., April 12.—Trolleys, which ceased operation here several months ago, have been replaced by busses, to the satisfaction of all concerned, says a notice mailed to this paper from the above city, where special Packard busses are now in operation on regular scheduled service.

Many sections which were not served by the street cars are being taken care of, and all things considered the cars are not being missed.

It is stated that the street cars suspended operations following a difference of opinion with municipal authorities and that within 24 hours after service had been stopped the vanguard of the present bus system was carrying passengers.

The first automotive equipment used consisted of nondescript vehicles of every kind and description, the main idea being to get something that would run and carry passengers. These jitneys are said to have served their purpose well, and to have carried all passengers without inconvenience until such time as the new system was in operation.

James R. McCallum has been transferred from the engineering office of the tank, tractor and trailer division of the Ordnance Department, located at the Holt Manufacturing Company, Peoria, Ill., where he was designing engineer, to the Rock Island Arsenal, Rock Island, Ill., to perform the duties of automotive engineer.

Development of Asphalt Industry

(By PREVOST HUBBARD, Chemical Engineer, the Asphalt Association.)

PRIOR to 1902 the term asphalt was confined almost exclusively to certain semi-solid or solid bitumens which were found in natural deposits most of which occurred in admixture with clay, silt or vegetation which could not be removed by ordinary refining methods. When the mineral matter predominated the product was termed asphaltic sand or rock asphalt depending upon whether or not the mineral structure was loosely or firmly knit together.

NO appreciable tonnage of asphalt was used in this country until 1883 when about 35,000 tons were imported mainly from Trinidad and found its way into the paving industry. Prior to this relatively small quantities of Trinidad asphalt and certain European rock asphalts or bituminous limestones had been used in the construction of pavements in a few American cities. As most of the European rock asphalts contain less than 15 per cent. of asphalt proper while the refined Trinidad asphalt uniformly carries about 56.5 per cent. of bitumen they were eventually unable to successfully compete with the latter and until 1892 Trinidad asphalt was used to such greater extent, that, in most minds, the term asphalt came to mean Trinidad asphalt.

In 1892 a relatively pure asphalt deposit occurring in Venezuela and known as Bermudez Lake asphalt, was exploited in small quantities and this product began to find its way into the United States, where it was also used in pavement construction. From this time on Trinidad asphalt was obliged to share honors with Bermudez asphalt, the importation of which gradually increased until at the present time it is nearly equal in tonnage to the Trinidad asphalt. Other foreign asphalts occurring in Venezuela, Cuba and elsewhere have appeared temporarily on the American market, but never in any great quantity. Large

deposits of asphaltic sands and rock asphalt have been found in this country, but their development has been limited as many are unsuited for present industrial purposes. Comparatively small deposits of very hard and nearly pure asphalt commonly known as Gilsonite, Uintaite, Grahamite and Wurtzilite have also been discovered in various parts of the United States and have been found particularly well suited for the manufacture of asphalt specialties. Their combined available tonnage has, however, been so small that their use in the two main asphalt industries, paving and roofing, has been very limited.

Asphalt Originates in Petroleum.

Practically all native asphalt is too hard for direct use in the manufacture of asphalt products and after a simple refining process which consists in heating the crude material until water, gas and other volatile material is driven off, it must be softened to suitable consistency by combining it with the proper amount of residual petroleum known as flux oil. Petroleum heretofore always served as an important integral part of all asphalt used for industrial purposes. For many years it was believed, and it is now generally admitted that, all asphalt originates in petroleum.

The petroleum, first known and used in the United States occurring in Pennsylvania, Ohio and Indiana, was of the paraffin type. When distilled to remove the more volatile constituents this petroleum was found to yield a thick, greasy oil residue, which in no way resembled asphalt except in color, but which proved quite satisfactory for use as a flux. If distillation was carried further this residual oil underwent certain chemical changes due to cracking of the hydrocarbon constituents and eventually coke remained in the still.

As early as 1865 it was known that bituminous material was sus-

ceptible to the action of certain oxidizing agents which caused the product to become more viscous, and in 1894 Francis X. Byerly was granted a patent for blowing air through petroleum residue when heated to between 400 per cent. and 600 per cent Fahrenheit. By this process it was found possible to produce a semi-solid residue which in some ways resembled the native asphalts, but which, with the type of oil used was more or less cheesy in character and lacked the cementitiousness of the then known asphalts. This product was marketed as Byerlyte asphalt, but never found much favor in the paving industry because of the inferior results attending its use. It was found, however, that when so treated, residual oils from petroleum occurring in the gulf section yielded a better grade of product than the more highly paraffin type of petroleum.

Future Supply Assured.

With the discovery and refining of California petroleum it was observed that when the residual oil was further distilled and before coke was formed, a semi-solid residue was produced which very closely resembled the native asphalts. The original petroleum was therefore called asphaltic petroleum. The asphalt first manufactured from this type of petroleum proved to be of rather inferior quality, the cause of which was later shown to be due to the high temperatures required to drive off a sufficient amount of oil constituents to produce a semi-solid residue. At such temperatures the hydrocarbons began to crack up with the formation of undesirable decomposition products. Later it was found that if distillation was conducted with a copious amount of steam used to agitate the contents of the still, cracking could be largely prevented as the volatile products were removed at a much lower temperature. This discovery not only assured a large future supply of

high grade asphalt from domestic sources, but conclusively proved that asphalt originates in certain petroleum; that it is actually held in solution in such petroleum; and that when recovered by suitable means it is essentially the same as certain native asphalts.

By 1902 petroleum asphalt was on the American market in appreciable quantities, about 20,000 tons being manufactured during that year. It found its way into the paving industry where it was received on trial for a number of years until service over a considerable period of time demonstrated that it was equally as good for paving work as the lake asphalts. By 1911 the tonnage of asphalt produced from domestic petroleum exceeded the importation of Trinidad and Bermudez asphalt and from that time on the production from this source has grown rapidly.

Mexican Product Imported.

In 1913 large quantities of Mexican petroleum found its way into the United States. This petroleum is highly asphaltic in character and when subjected to steam distillation yields a much higher percentage of asphalt than any petroleum found in the United States. About 100,000 tons of asphalt were produced in 1913 from this source as compared with about 230,000 tons of imported native asphalt and over 400,000 tons of asphalt produced from domestic petroleum. This year showed the peak of importation of native asphalt which was at that time equal to only a little more than two-fifths of the total production from petroleum. From that time on there has been a general decline in importation of lake asphalt with a very rapid increase in asphalt distilled from petroleum.

The growth in asphalt tonnage from Mexican petroleum has been even more remarkable than from domestic petroleum and since 1918 has exceeded the latter. Statistics of the United States Geological Survey for 1910, which are the latest ones available, show the following:

Asphalt from domestic petroleum 614,692 tons 41.4%

Asphalt from Mexican petroleum	674,876 tons	45.5%
Domestic native asphalt (bituminous rock)	53,589 tons	3.6%
Other domestic native bituminous substances)	34,692 tons	2.3%
Asphalt imported from Trinidad and Tobago	51,062 tons	3.5%
Asphalt imported from Venezuela	47,309 tons	3.2%
Other imported asphalts, including bituminous rock....	7,277 tons	.5%
	1,483,497 tons	100.0%

*Asphalt exported from the U. S. 40,208

Approximate consumption of asphalt in U. S. 1,443,289

*Note—This does not include manufacturers of asphalt which are valued at approximately one-half the value of the tonnage of asphalt exported.

Majority Obtained from Petroleum.

From this table it is seen that nearly 87 per cent. of all asphalt produced by or imported into this country is obtained from the distillation of petroleum. If the mineral and other extraneous matter in rock asphalt and Trinidad and Bermudez asphalt is eliminated a conservative estimate would raise the proportion of petroleum asphalt to over 92 per cent. of the total, leaving about 1.4 per cent. Trinidad bitumen and 3.2 per cent. Bermudez. The fact that the bitumen of lake asphalt now constitutes less than five per cent. of the total asphalt consumed by the United States may be surprising to the many who have heretofore considered the lake asphalts as the most important.

The generally accepted definition of asphalt describing its consistency or hardness is that it is a semi-solid or solid. The principal test for consistency is known as the penetration test and is ordinarily made by determining the distance that a standard needle will penetrate a sample of asphalt when it is maintained at 25° C., the needle being loaded with a given weight and the load being applied for a given length of time. The depth which the needle penetrates is expressed in units of 0.1 mm. each. Unless otherwise indicated the load is considered to be 100 grams and the time of application five seconds. There is no distinct line of demarcation between a fluid and a semi-solid, but the American Society for Testing Materials has

adopted the following arbitrary definition, which may serve as a rough division between asphalts and fluid residual petroleum products. "Liquid Bituminous Materials:—Those having a penetration at 25° C. (77° F.) under a load of 50 grams applied for one second of more than 350." Materials which under this test show a penetration of less than 350, but more than 10 when tested at the same temperature with a load of 100 grams for five seconds, are classed as semi-solids. If the material shows a penetration of less than 10 when tested as last described it is called a solid. Road oils and some fluxes may be classed as liquids under these definitions and therefore not asphalts. The heavier and more viscous fluxes, however, would be classed as asphalts. The Geological Survey in its 1919 report has made no distinction between asphaltic materials with reference to use or consistency so that the figures previously quoted include some tonnage of what may be classed as liquid asphaltic products. In fact such products are sometimes marketed under the name of liquid asphalt owing to the very high percentage of asphalt which is held in solution by the oily constituents which are present.

Mexican Product Important.

The highway asphaltic crude petroleum sometimes carry such a large proportion of asphalt that this product becomes of primary importance in refining. This is particularly true of Mexican petroleum from the heavier grades of which over 70 per cent. of asphalt of 100 penetration may be obtained by steam distillation. Heavy California asphalt may by the same process yield as high as 50 per cent. of asphalt of the same penetration. From other domestic petroleum it is impracticable to commercially recover asphalt unless the blowing process is employed or the fluid residual petroleum is first subjected to a carefully controlled cracking process under pressure. In some cases, however, the other domestic crudes are utilized in the manufacture of asphalt by mixing them with Mexican crude before distillation.

In spite of the large tonnage of asphalt produced from domestic petroleum, its manufacture from this source constitutes only a very small part of the petroleum industry. The specific gravity of domestic petroleum asphalt averages about 1.01 or 8.4 pounds per gallon. On this basis the volume of domestic petroleum asphalt for 1919 amounts to about 146,000,000 gallons as against approximately 15,864,000,000 gallons of crude oil, or less than one per cent. by volume of crude. Mexican oil asphalt averaging 1.04 specific gravity shows about 155,000,000 gallons for 1919 as against approximately 2,218,000,000 gallons of Mexican crude oil, or about seven per cent. When it is considered that practically all Mexican petroleum is highly asphaltic in character these figures show the possibility of increase in asphalt production from this source to be very great as the demand increases. At the present time an enormous quantity of asphalt present in crude petroleum and many times greater than the amount actually produced is not being recovered, but is burned as fuel oil.

Asphalt Oldest Adhesive Known.

Asphalt is the oldest waterproof adhesive known to man and since its production from petroleum has made it readily available in large quantities it has been adapted for a surprising number of industrial purposes. Of these the paving industry consumes the greatest proportion. The probable consumption of asphalt of 190 penetration and less in pavement construction and maintenance during 1921 has been estimated by J. E. Pennybacker, secretary of the Asphalt Association, to be about 634,000 tons. To this may be added about 35,000 tons of flux necessary to soften the harder grades to suitable consistency, giving a grand total of 669,000 tons. Allowing 10 per cent. for maintenance this amount will be sufficient to construct about 60,000,000 square yards of asphalt pavement, or on the basis of a 20 foot width over 5000 miles of such pavement.

Much Used by Roofing Industry.

In the consumption of asphalt the

roofing industry is a close second to the paving industry and together they consume probably 90 per cent. of the entire asphalt output if road oils are not included. The development of the asphalt roofing industry to sizeable proportions has been more recent than the paving industry, but was given a great impetus during the late war period owing to the enormous demand for ready and prepared roofings. Herbert Abraham, chairman of the Technical Committee of the Prepared Roofing Association estimates the present annual consumption of asphalt, including flux by the roofing industry, to be about 625,000 tons, equivalent to 28,375,000 squares of roofing. Figuring an average of about 10 squares to a dwelling this amount is sufficient to cover more than 2,500,000 dwellings, or over 280,000,000 square yards of roof.

In addition to paving and roofing there are a large number of industries which in the aggregate consume about 144,000 tons of asphalt. A considerable amount of this is used for waterproofing and flooring and lesser amounts for sheathing and insulating purposes. Asphalt also finds its way into the manufacture of considerable quantities of rubber goods, paints, varnishes, enamels and japans, and such specialties as anti-acid compounds, pipe dips, bituminous putty or cement, emulsions, moulding compositions, electrical insulating products, sealing compounds for storage batteries, wall boards and floor coverings.

Used as Binder.

In most finished products asphalt is used primarily as a binder or coating for the body of the structure and constitutes but a fraction of the total weight of such products. Its use is therefore dependent upon the consumption of large quantities of other materials, the production of which represent industries dependent to a considerable extent upon the asphalt industry. Thus in pavement construction, considering only that portion of the pavement which is bound together with asphalt, an average of about eight per cent. of asphalt is used to bind 92 per cent. of mineral aggregate. This repre-

sents an annual consumption of over 8,000,000 tons of broken stone, gravel and sand in pavement construction, including nearly 400,000 tons of pulverized limestone or Portland cement filler. The manufacture of asphalt roofings probably consumes in the neighborhood of 200,000 tons of felt and similar fabrics and 300,000 tons of mineral surfacing such as talc, mica, silica, sand and crushed rock.

Without considering the various materials used in asphalt specialties a rough approximation of material annually consumed in the manufacture of asphalt products, including pavements, would be as follows:

Paving asphalts and fluxes	669,000 tons
Roofing asphalt and fluxes	625,000 tons
Asphalt for specialties	144,000 tons

Total asphalt not including road oils	1,438,000 tons
Sand, gravel and crushed rock for paving	8,000,000 tons
Mineral surfacing for roofing	300,000 tons
Felted and other fabric for roofing	200,000 tons
Grand total	9,938,000 tons

PREFERRED STOCK DIVIDEND ASSURED.

Conspicuous among the farm implement statements resulting from 1921 operations, is that of the J. I. Case T. M. Company of Racine, Wis. In a year recognized as unfortunate for this industry, definitely reflected by large losses and seriously impaired surplus accounts, the Case T. M. Co., by contract, shows net operating profits for the year of \$405,914.48.

Losses through shrinkage in inventory values and idle plant expense of \$3,289,345.72 result in a net charge against surplus of but \$583,431.24, the balance being absorbed by the company's adequate reserves. It is interesting to note that the reserves set up in previous years were sufficient to cover all losses if so applied.

Conservative management wisely sets up additional reserves of \$700,000 for further contingent inventory losses against an inventory of \$14,634,368.42. The inventory was reduced during the year by \$7,757,853.73.

The company's sound financial position is evidenced by a reduction in notes and accounts payable of \$2,651,470.64. The debt at the close of the year is \$5,855,000 of bills payable and \$601,221.24 of accounts payable, a total of \$6,456,221.24. This debt is protected by \$21,411,013.03 of current assets, the ratio of current assets to debt being 331 per cent.

The surplus remains at \$1,622,491.15, and the reserve for contingent losses at \$1,000,000 besides a special inventory reserve of \$700,000 shown in the deduction from the inventory, making a total reserve for contingencies of \$1,700,000.

TRUCK AND BUS ACCESSORIES

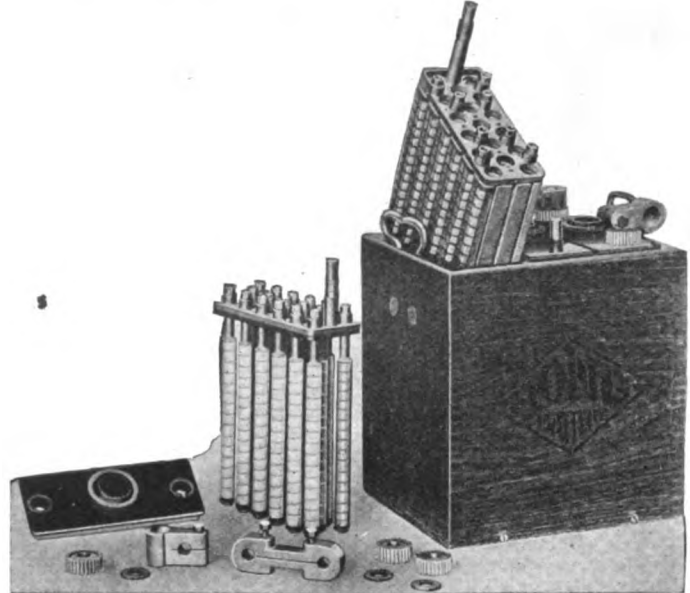
The New Bong Battery is claimed to be built on a decidedly different principal of construction, a departure from the conventional design, although the usual lead elements with regular filler and standard electrolyte are used.

One of the main features of this bat-

old approved elements, is said to allow the owner driver to make his own inspections and repairs.

The positive plate or element consists of a series of pencils, so designed that any one of which can be removed from its respective grid and replaced with a

The negative plate or element is built up of a series of grids or tubes in such a way as to make a cylindrical orifice into which the positive pencils are set; thus it can readily be seen, also by the illustration, that separators, in the ordinary sense, are entirely eliminated. The re-



tery is that it can be completely pulled down or all the elements removed or replaced by any one with nothing but an ordinary wrench.

What is called an improvement in design, but still embodying the

new pencil should wear or accident necessitate such replacement. These pencils are securely and electrically connected and locked in a positive position by an original idea so as to offer no resistance to the current.

placement of positive pencils requires only a few minutes and can be done by the owner.

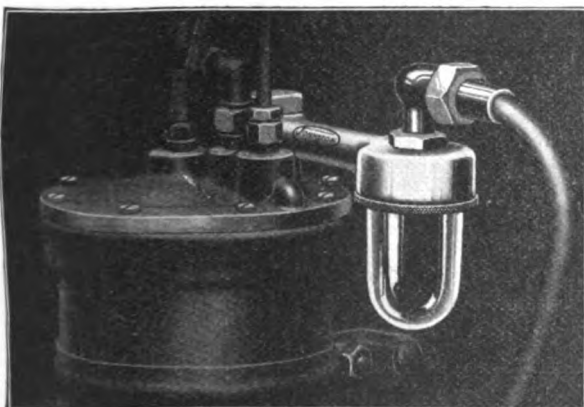
Manufactured by the Bong Battery Corporation, 1475 Meet Avenue, Chicago, Ill.

New Johnston Visible Gasoline Filter for Stewart Vacuum Tanks is claimed to provide adequate means for filtering the gasoline before it enters the tank thus eliminating water, lint, grit and dirt. Whenever the hood of the car is raised a glance at the glass bowl readily shows whether it requires cleaning or not. It takes but a minute to dump the bowl as a few turns to the left on the threaded lock nut release it from which the accumulated dirt or water can be thrown out. This method of catching and stopping the cause of a whole lot of trouble, should provide a very practical and useful article, also make a good article for the jobber or

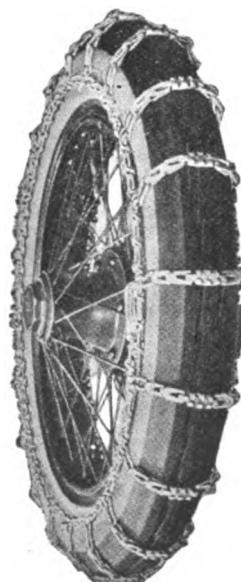
tank in the other opening of the filter arm above glass bowl and screws it down tightly so that it goes through hole in center of filter screen. Then screw the regular connection which, in most cases, is an elbow connection into the bushing. The filter is then ready for use.

Manufactured by the Wm. R. Johnston Mfg. Co., 451-469 E. Ohio St., Chicago, Ill.

The Ace Non-Skid Chains present features entirely new, it is said. The cross chains consist of a center unit supplemented with side links and hooks to constitute different sizes to fit pneumatic tires.



dealer to handle the coming year. This filter is made to fit the standard Stewart vacuum tank without any changes, and is a nicely made and a sightly article, very easily attached by disconnecting the main gasoline pipe at top of tank by removing elbow and bushing and attaching the small end of the filter arm by using hollow screw plug and two copper asbestos gaskets, which are furnished. In fitting, the operator places bushing removed from vacuum

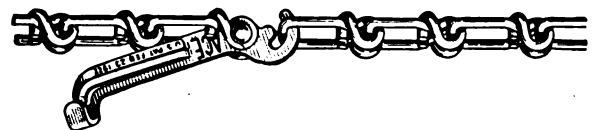


The purpose served is that of presenting a sufficiently rough surface to the road as, each center link having teeth, thereby causing an effective gripping sur-

face, slipping or skidding is almost impossible on wet or slippery pavements, while the inner surface is smooth and conforms to the tire, avoiding any possible injury thereto.



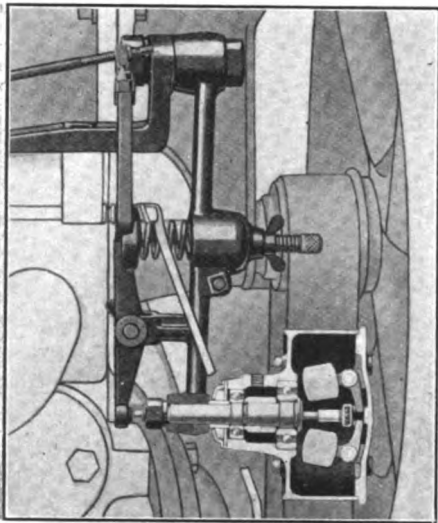
Unlike certain varieties with which most motorists are familiar, Ace cross chains are said to be made of solid, pressed, flat steel, cyanide hardened. The material, treatment and construction combine to effect the purpose of the chain—to insure safety, preserve the tires, give greater traction and increased mileage.



The Ace patent fastener permits the side chains to be drawn tightly around the circumference of the wheel (without the use of tools of any kind), holding the smooth inner surface of the cross chain close against the tire.

Manufactured by Ace Chain Corporation, 23 South William Street, New York City.

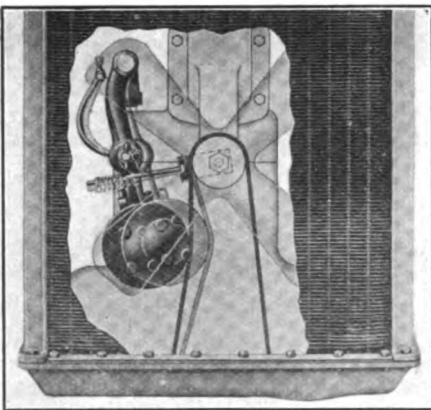
The Wehr Throttling Governor, just announced from the factory, has many absolutely new features which make it of extreme interest both to the Fordson dealer and owner.



One feature of the Wehr Throttling Governor is that it does not need an expert mechanic to install it. In fact, anyone can install this governor in less than 15 minutes. There is no necessity to re-time the motor, change the location of the timer, remove the regular Fordson butterfly valve or change the gas throttle or other levers. There are no holes to drill. All that is necessary is the loosening and tightening of two cylinder head cap screws when the governor is installed.

Another big feature of the Wehr Throttling Governor is the extremely low price. This governor sells retail for \$18.50 complete. It is made of the highest grade material throughout and the greatest care and engineering skill have been expended on the manufacture of it.

The governor is of the fly-ball type and operates on the same principle as the gov-



ernor on a steam engine. It gives extremely close regulation of the motor speed and effects surprising fuel economies.

Long and exhaustive tests have been made of this governor and it has satisfied all observers of its capacity for regulating motor speed without any noticeable variation.

Another big feature of the Wehr Throttling Governor is the fact that it acts as a fan belt tightener. The governor case forms the idler pulley, running against the slack side of the belt. The case is light in weight and runs in oversize ball bearings. Consequently it requires a very slight pressure against the belt to drive it. The tension of the spring holds the governor tightly against the fan belt and

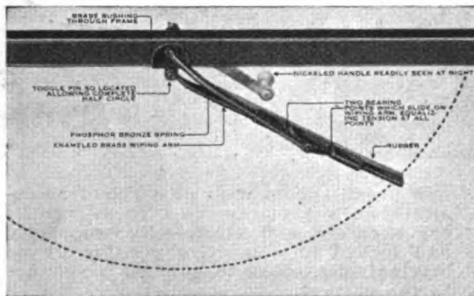
takes up the slack as the belt stretches. This prevents any possible slippage of either governor or fan. A water or oil-soaked belt would not affect the operation in any way and the governor prolongs the life of the fan belt.

The speed of the governor is one and a half times the engine speed. Regular Fordson fan pulley roller bearings are used, which are 50 per cent. oversized for the actual governor needs. This practically eliminates friction or wear. The governor case forms an oil reservoir, holding a week's supply at one filling and making an oil bath for all moving parts, which are enclosed in a dust-proof case. The operator regulates the speed by means of the regular gas throttle lever.

Manufactured by the Wehr Company.

Perfection Windshield Cleaner, durably made of brass in either nickel or black enamel finish, is proof against rust and will last longer than the car upon which it is installed it is stated. It does not require any holes to be bored in the glass, but is fastened securely in place through or clamped over the top of windshield frame. When not in use it is out of sight so that it never interferes with the vision of the driver.

The cleaning is done by a strip of live rubber which is held firmly against the



glass by a phosphor bronze spring in such a position that it cuts the rain or snow from the windshield instantly, in a full half circle. By a patented arrangement the rubber blade oscillates and slides in a channel piece, which is fastened to the spring arm, thus producing an even pressure at all points of the rubber as it travels across the windshield. This prevents the rubber from cracking and breaking.

The Perfection Windshield Cleaner is easy to operate, being light, well balanced and so mechanically perfect that it has been adopted as standard equipment by a number of manufacturers of high grade cars. Installed on any enclosed or open car it permits the windshield to be raised to a horizontal position without interference.

The Perfection Windshield Cleaner is made in two styles, single and double. The latter is especially desirable for enclosed cars where it is often necessary to clean the steam which gathers on the inside of the glass.

Once installed it is never necessary to remove the windshield cleaner. It is not only attractive in appearance, but is always out of sight and out of the way when not in use.

In every way it is a quality product—one that will give lasting satisfaction.

Manufactured by Perfection Sales Company, Sun Building, Detroit, Mich.

The Tiffany Parking Lamp fits flush with the fender and has the appearance of being "built into" the car. It is not an accessory, but a part of the car. The mounting screws and connections are concealed and there are no screws to rust and become unsightly.

Due to its rounded lines and low mounting it is not liable to be caught by passing objects. It has a readily accessible but concealed switch. A prominent switch

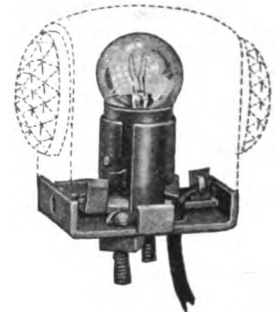
is an invitation to every passing boy to play with the lamp.

An especially attractive feature in the lamp is the very simple operation necessary to replace burned out bulbs. Instead of removing the two small lenses and placing the bulb through the small opening in the usual manner, bulbs are quick-



ly and easily replaced in the Tiffany lamp by merely snapping off the cover, which leaves the lamp socket fully exposed.

A "Standard two candle power six-eight volt," double contact bulb is used

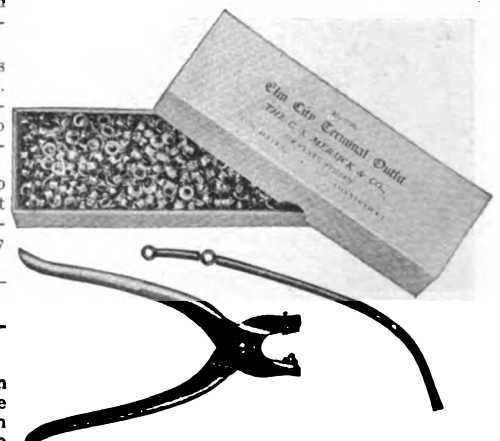


and new bulbs may be purchased from any dealer or garage. The simplicity of the design is unique. It is ruggedly constructed throughout.

Manufacturing by Tiffany Manufacturing Co., Spring Street, Newark, N. J.

Elm City Terminal Outfits are made for the convenience of garage employees, storage battery man and wiring experts. The outfit consists of 1000 brasslets and an eight-inch nickel plated punch with knurled handles.

The operation is very simple as the operator just removes the insulation from



the wire, splits the ignition cable, twists wire around the brasslet and operates the punch. This outfit is a great time saver and fills a long-felt need in auto repair shops and factories.

Sold by C. S. Merriack & Company, 274-82 State Street, New Haven, Conn.

(When Writing to Advertisers, Please Mention the MOTOR TRUCK.)

Organization Headed by Well-Known Men Will Manufacture Vacuumeter

**BACKERS CONFIDENT THAT HIGHLY SPECIALIZED DEVICE WHICH
KEEPS ACCURATE CHECK ON FUEL SYSTEM AND ELIMINATES ALL
GUESS-WORK ON PART OF TRUCK DRIVER WILL HAVE BIG MARKET.**

THE one word that is most frequently used in automotive talk these days is "performance." Manufacturers talk about performance, and users brag about the performance of their cars in proportion to their optimism. Anything, therefore, which will improve performance is a step forward, and one which will be gladly received by the public.

To perform properly, the various reciprocating units of a car must be in proper relative function. Granting that all parts work together as they should, the entire performance is dependent upon one thing—gasoline carburetion. Since carburetion is the source of all performance, it naturally follows that improper carburetion is the source of most trouble.

THE thousand of ideas for the improvement of carburetion received by the patent office, proves that the need of better carburetion is the dominant idea in the automotive field. As a chain is no stronger than its weakest link, so an automobile is no better than its gasoline performance. Many are the methods used to increase fuel energy by aiding vaporization, such as water-jacketed manifolds and other types of heating units, all with but one object in view—more power with less fuel.

When the vacuum feed system is functioning properly, no one can find fault; it is only when it fails to do so that trouble occurs. When such is the case, if the trouble can be easily located the necessary steps can be taken to enable the carburetor to again function at its highest efficiency. The great need, therefore, has not been better methods of carburetion, but some means of immediately detecting and locating the cause of carbureting troubles.

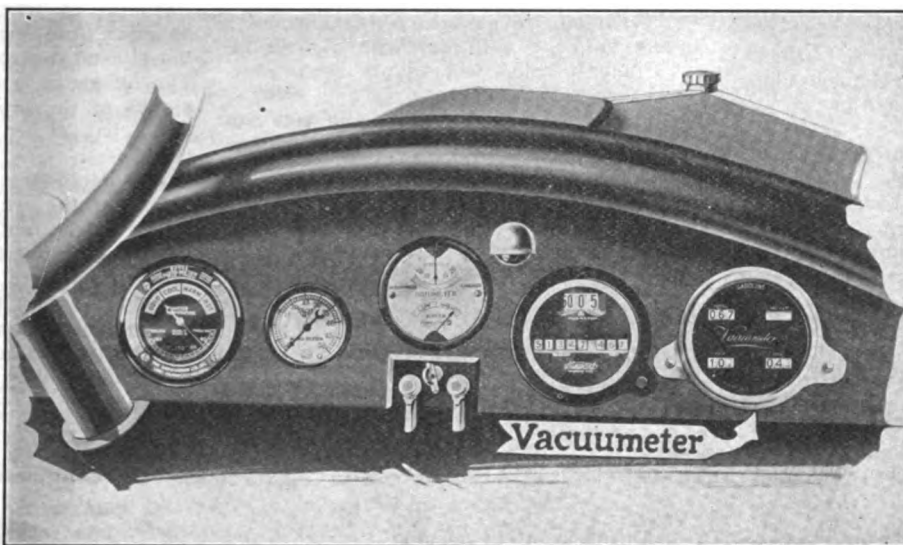
There are various causes of carburetion troubles, such as foreign matter in

the various lines, mechanical derangement of parts of vacuum systems and leaks in the system. While filtering systems have been introduced and perfected to insure clean gasoline entering the carburetor, these devices do not take care

immediately warn of faulty feed system and mechanical derangements, insuring perfect performance and avoiding expensive repair bills. Many experiments have been made in the last 10 years, but it remained for J. J. Albright, an automotive engineer in Columbus, Ga., to solve the problem and provide a precision instrument which supplies the last great requirement for automobile performance.

The modern instrument boards have been carrying meters for indicating all necessary information except the one of which we have spoken. The speedometer shows miles per hour, miles per trip, and total mileage, but its greatest value comes from the application of this information in determining

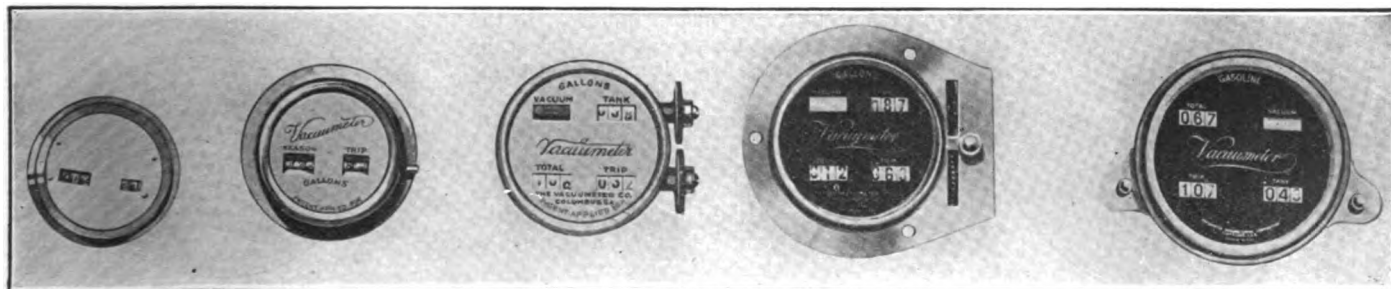
proper lubricating periods, tire performance and similar items. The ammeter shows at a glance the electrical performance and immediately indicates improper functioning of the generator. The oil meter indicates the lubricating performance, the motor meter indicates the performance of the cooling system



The Vacuumeter, Artistically Designed and Finished, Fits in Well with Its Surroundings, Enhancing the Appearance of the Instrument Board.

of clogging in the feed lines before reaching the filtering device. When such obstruction occurs, it has heretofore been very hard to detect and locate. The same is true of small leaks and other difficulties.

Automotive engineers have realized for years the need of a device which would



This Picture Graphically Illustrates the Evolution of the Vacuumeter Through Five Models. Left to Right—Model A, 1918; Model B, 1919; Model C, 1920; Model D, 1921; Model E, 1922.

and, like all valuable recording meters, has now found its proper place on the instrument board.

While the great value of all these instruments cannot be disputed, there still has been one great lack, which is now supplied in the Vacuumeter. It was a realization of this great need which set Mr. Albright to work perfecting a meter that would register exactly all necessary information pertaining to vacuum feed systems—a meter that would give the driver the assurance that the fuel system was in proper function, or warn him that faulty operation was taking place and give this information in sufficient time to avoid serious damage to his motor or actual stoppage of his engine.

The vacuum feed system, because of its superiority, has practically superseded pressure and gravity types of fuel feed and only requires mechanical supervision.

In tackling this proposition, Mr. Albright realized that it would be no child's play. Many obstacles confronted him, which had baffled other experts, and of which he was well aware. The instrument, to be of any value, must be a precision instrument. It has taken four years of concentration to develop the vacuumeter to its present state of perfection.

What the Vacuumeter Does.

The Vacuumeter, it is claimed, will supply the following information with absolute precision:

1. The exact amount of gasoline in supply tank at all times.
2. The exact amount consumed on trip, or for any given period.
3. Total amount consumed.
4. The exact miles per gallon at any instant.
5. That car has been used without permission.
6. That vacuum feed system is in proper function.
7. If out of order, it points out the trouble instantly, in advance of actual damage to motor, or waste of fuel.



C. M. Barnes, President and General Manager, Vacuumeter Manufacturing Corporation.

All this is shown at a glance. It does not require an engineer to realize the tremendous advantage of this indicator; any motorist will hail with joy an instrument which will supply such information.

It will be interesting to note how the instrument provides this information. The Vacuumeter is operated by the vacuum created by the engine—the same vacuum which operates the vacuum feed system. Therefore, any leak in the system is indicated by a partial red signal on the window marked "vacuum." The vacuum system operates approximately 32 times to transfer a gallon of gasoline from the supply tank to the vacuum tank, the Vacuumeter checking every one of these operations, giving detailed reports of every function of the system and consequently on all of the gasoline consumed.

The Effect of Leaks.

Direct waste of gasoline through leaks is a more common occurrence than most car owners realize. A flooding carburetor and leaky connection at either end of the gravity feed line, or a leak in the bottom of the vacuum tank itself, will drain the vacuum tank in a short time. Enough gasoline may remain in the carburetor to start the motor, and the tank will refill by several rapid operations of the system. The fact that sufficient gasoline remained in the carburetor to start the motor was of great convenience. It was also a blindfold to the owner's knowledge of costly fuel lost, as well as of extra fire hazard, which is far more serious. A quart of gasoline in the drip tank is as dangerous as a match in a powder mill.

The Vacuumeter gives notice to the driver every time the vacuum tank is drained, or partially drained, through the excess number of operations necessary to refill it.

Feed Line Obstruction.

Stoppage may occur in any part of the

gasoline line from the main supply tank to the vacuum tank. It seldom develops suddenly, but as a rule is built up by an accumulation of small particles of dirt and other foreign substances in the screen or in constricted portions of the line.

But the first knowledge the driver now has of the trouble is when his motor stops.

The Vacuumeter warns the driver as soon as the slightest accumulation interferes with the normal flow of fuel.

Flooding.

Vacuum tanks flood, due to derangement of the internal mechanism. In extreme cases the condition will affect the operation of the motor and the accepted belief is that the flooding will always show up. This mistake, like so many others, is due to the fact that there never has been any way to detect this trouble. It is true that a vacuum tank floods at times without causing any unusual action of the motor. The damage that may be done to a motor is only limited by the value of the motor.

In other words, a flooding vacuum tank if allowed to continue may possibly burn out the engine. The gasoline drawn into the manifold from the suction line will wash the oil from the piston and rings, go down into the crank case, mix with the oil and destroy its lubricating value. The oil gauge will show that the liquid stands at the proper level in the crank case, but it cannot show what the liquid is.

The Moto-Meter Company, manufacturers of the well known Boyce Moto-Meter, warns motorists of this prevalent source of overheating and damage. While the gauge may say plenty of oil, the quantity may be in reality a thin mixture of gasoline and lubricating oil, the greater proportion of which is gasoline, possessing little or no lubricating qualities.

Flooding, like all the other troubles that may develop in a vacuum system, is

(Continued on Page 222.)



H. E. Armstrong, General Sales Manager Vacuumeter Manufacturing Corporation.



J. J. Albright, Chief Engineer Vacuumeter Manufacturing Corporation, Inventor of Vacuumeter.

State Regulation of Motor Vehicle

(By HARRY MEIXELL, Secretary Motor Vehicle Conference Committee.)

MOTOR vehicles are subjected to two general but distinct uses: First, they are privately employed by their owners for the transportation of persons or property; second for the transportation for hire of persons or property of others than their owners.

The second general use is sub-divided into two definite and particular uses. In the first place, motor

vehicles operating for hire are employed to carry certain persons or the property of certain persons to places prescribed in individual agreements entered into for the purpose; in the second place they are employed to carry indiscriminately all persons or the property of all persons under general conditions of agreement applicable to the whole public.

IN A word, the second general use of motor vehicles, i. e., for hire, splits into that of private carriers and common carriers.

Until a few years ago the legislatures of our 48 states in no way differentiated between these various uses of the motor vehicle in the laws which they enacted dealing with operating requirements, registration fees and the many other subjects which are usually found in a state's motor vehicle laws.

In 1914, however, Pennsylvania definitely segregated motor vehicles when used as common carriers and placed them under the regulation of the State's Public Service Commission. Today the laws of 22 states provide for a greater or less degree of such state control.

On the following pages is a tabulation setting forth a digest of the more important matters which through the year 1921 had been made the subject of those state laws specifically enacted to bring motor vehicle common carriers under state control and regulation. This tabulation should be carefully considered in connection with the following discussion of the data which it contains.

State Agency Exercising Control.

Without exception state regulation of motor vehicle common carriers has been vested by law in pre-existing state agencies that exercise control over other forms of common carriers such as railroads, trolleys, telephone and telegraph lines, pipe lines, etc. The third column of tabulation on page 4 shows that these agencies have consisted of State Public Utilities or Public Service Commissions, Railroad Commissions, the Commerce Commission as in the case of Illinois, the State Tax Commission of Alabama, the Arizona Corporation Commission or even the State Road Commission as in West Virginia.

In some instances these pre-existing state agencies have assumed control over motor vehicle common carriers by virtue of the broad general powers of the laws establishing the Commissions. The Railroad Commission of Georgia, for instance, maintains "that operators of motor vehicles, holding themselves out as carriers of passengers or freight, either or both, for hire, and operating over established routes, are subject to the jurisdiction of this Commission. This Commission has not, however, had occasion up to this time to exercise this jurisdiction." In certain other instances, however, where the laws have been specifically

limited in their application where their application to motor vehicle common carriers has been a matter of doubt, attempts on the part of the state agencies to extend their power over highway transportation have usually ended in the courts and in decisions adverse to the contemplated expansion of control.

Application of Control.

In its broadest conception a motor vehicle common carrier is one that passes any and everywhere over the highways indiscriminately, transporting for a consideration all person who present themselves as passengers or carrying all commodities or classes of commodities offered. Obviously this involves interstate transportation. The Federal Interstate Commerce act takes no specific cognizance of the matter, however, so the application of control by the various states is in no way guided or modified by Federal laws on the subject.

A few states deal with the subject merely from the standpoint of local control, the incorporated municipalities being given power by the state legislature to require motor vehicle common carriers to obtain permission and a license for operating from the local governing body. This is the case in Massachusetts where the Board of Selectmen or City Council exercise control over motor vehicle common carriers transporting passengers.

As for state control this expresses itself in two ways: On the one hand there is a state law whose provisions give to some state agency broad general powers of control over motor vehicle common carriers. On the other hand, for the execution of these powers, the agency is permitted to promulgate and enforce such rules and regulations as it may deem necessary, express stipulation being made in some of the state laws on the subject, that these rules and regulations shall take precedence over municipal ordinances.

The various laws establishing and defining this state control have in many cases, however, greatly narrowed its application. For instance, while most of the states which have dealt with the subject allow their respective state agencies to regulate both passenger and property transportation by motor vehicle common carriers, Alabama, Connecticut, Maine, New Hampshire and others limit this power to passenger transportation only.

Then again, while most of the regulat-

ing states apply their powers of control to carriers operating within, into and out from the limits of incorporated municipalities, California, Ohio and Oregon merely exercise authority over such transportation that is not confined solely to the limits of a city, town or other similar form of incorporated municipality.

As another and final illustration most state laws regulating motor vehicle common carriers narrow the scope of such control to vehicles operating "between fixed termini or over a regular route." In the Arizona law this expression is defined to mean the termini between which or the route over which a carrier usually or ordinarily operates his motor vehicle "even though there may be departures from said termini or route, whether such departures be periodic or irregular." As a rule it is made a question of fact for the fact state agency exercising control to determine if the carrier is operating "between fixed termini or over a regular route."

Powers of State Agency.

With very few exceptions the powers wielded by the Public Service Commissions or similar forms of state agencies over common carrier transportation by motor vehicles are extremely numerous and broad. A consultation of the chart shows that these powers can be listed as follows:

- (1) Grant, refuse to grant, amend or revoke certificates of public convenience and necessity.
- (2) Prescribe routes.
- (3) Fix schedules.
- (4) Determine character of service and promote the comfort and safety of traveling public.
- (5) Establish fares and rates.
- (6) Require reports and uniform methods of accounting.
- (7) Examine accounts and records.
- (8) Supervise fiscal affairs such as incorporation, capitalization of stock, etc.
- (9) Compel additions to, extensions of or betterments in physical equipment.

It is apparent that these powers are practically unlimited and of such a nature that the state agency has almost absolute control over the life or death of motor transportation within its jurisdiction. Nevertheless all of the rulings of the various commissions are subject to review by the proper courts and aggrieved parties can easily and

Summary of Salient Features of State Laws Regulating Motor Vehicles

State	Law in ef- fect	State Agency Exercising Control	Application of Control	Prerequisites of Operation	General Powers of State Agency, Etc.	Special or Extra State Taxes
Alabama	1919	State Tax Commission	Passenger transportation only. Within, out from and into municipalities.	Filing of written statement showing terminal points of routes to be covered. Obtain- ing of special license.	..... x	In lieu of regular registration fees, the following Seating capacity 5 pass., or less \$37.50 Seating capacity over 5 pass., less than 10 60.00 Seating capacity over 10 pass. 90.00
Arizona	1919	Corporation Commission	Passenger and property transportation. Within, out from and into municipalities.	Certificate of Public Conven- ience and Necessity. Indem- nity bond as conditioned by Commission.	General control over granting of Certifi- cate of Public Convenience and Necessity; regulating service; fixing rates and fares.	..... x
Arkansas	x	..... x	..... x	..... x	..... x	..... x
California	1917	Railroad Commission	Passenger and property transportation. Out from and into municipalities only.	Certificate of Public Conven- ience and Necessity.	Grant, refuse, suspend, revoke or amend Certificates of Public Convenience and Necessity; prescribe service or extensions hereof; fix rates and fares, supervise fis- cal affairs; authorize sale or lease of cer- tificates.	..... x
Colorado	1915	Public Utilities Commission	Passenger and property transportation. Within, out from and into municipalities.	Permission from municipal- ities to operate. Certificate of Public Convenience and Ne- cessity.	Wide control over issuance of Certificates of Public Convenience and Necessity; pre- scribe service or extensions thereof; fix rates and fares; promote health, safety and convenience of operation. Municipal- ities may purchase and operate motor ve- hicle common carriers.	Special registration fees for passenger carrying motor vehicles: Seating 9 pass., or less, \$20; for each additional seat of capacity \$1
Connecticut	1921	Public Utilities Commission	Passenger transportation only. Within, out from and into municipalities.	Certificate of Public Conven- ience and Necessity. Indem- nity insurance based on seat- ing capacity; range \$5000 to \$10,000 per vehicle.	Grant or withhold Certificate of Public Convenience and Necessity. Street rail- road companies may acquire, own and operate motor vehicles for hire.	Extra registration fees as follows: Regu- lar fees plus \$15 for vehicle with seating capacity of 5 or less; over 5 but under 21, \$2 per seat over 5; 21 but under 41, \$5 per seat over 20; 41 or over, \$10 per seat over 40.
Delaware	x	..... x	..... x	..... x	..... x	..... x
Florida	x	..... x	..... x	..... x	..... x	..... x
Georgia	1917	Railroad Commission	..... x	..... x	The Commission holds that it has juris- diction over motor vehicle common car- riers, but has not as yet had occasion to exercise this power.	Special registration fees for passenger carrying vehicles with a seating capacity of ten or more, \$75.
Idaho	x	..... x	..... x	..... x	..... x	..... x
Illinois	1921	Commerce Commission	Passenger and property transportation. Within, out from and into municipalities.	Certificate of Public Conven- ience and Necessity. Ade- quate indemnity insurance or sworn statement of ability to meet any possible damage claims.	Grant, refuse, alter, modify Certificates of Public Convenience and Necessity. Regulate rates, fares, service, contracts, practices, etc.	Extra state tax on property carrying ve- hicles not operated exclusively within a municipality. Gross weight 12,000 lbs. or less, one cent per mile; over 12,000 lbs., two cents per mile. On passenger carry- ing vehicles gross weight 12,000 lbs. or less, 1/15 cent; over 12,000, but not more than 15,000 lbs., 1/6 cent; over 15,000 lbs., 1/6 cent per mile.
Indiana	x	..... x	..... x	..... x	..... x	..... x
Iowa	x	..... x	..... x	..... x	..... x	..... x
Kansas	x	..... x	..... x	..... x	..... x	..... x
Kentucky	x	..... x	..... x	..... x	..... x	..... x
Louisiana	x	..... x	..... x	..... x	..... x	..... x
Maine	1921	Public Utilities Commission	Passenger transportation only. Within, out from and into municipalities.	Certificate of Permission.	Make rules and regulations governing operation; fix fares, regulate routes and schedules, etc.	Special registration fee for passenger car- riers: 68 cents per hp. plus \$2 per passen- ger up to 8; \$3 per passenger, 8-25; \$5 per passenger over 25.
Maryland	1916	Public Service Commission	Passenger and property transportation. Within, out from and into municipalities.	Annual Permit.	Grant or refuse permits. Make rules and regulations governing operation. Fix rates, fares, schedules, etc. Provide for safety and convenience of traveling and shipping public.	Extra State Registration fee amounting to 100% over normal fee.
Massachusetts	x	..... x	..... x	..... x	..... x	..... x
Michigan	x	..... x	..... x	..... x	..... x	..... x
Minnesota	x	..... x	..... x	..... x	..... x	..... x
Mississippi	x	..... x	..... x	..... x	..... x	..... x
Missouri	x	..... x	..... x	..... x	..... x	..... x
Montana	x	..... x	..... x	..... x	..... x	..... x
New Hampshire	1919	Public Service Commission	Passenger transportation only. Within, out from and into municipalities.	Permit to operate. Indemnity bond of \$500 per vehicle plus \$100 per person of seating ca- pacity.	Grant or refuse permits. Establish rea- sonable rules and regulations governing operation.	25% extra registration fee for property carrying motor vehicles and passenger carrying motor vehicles seating more than seven passengers.

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freely appeal for redress of wrongs or supposed wrongs.

Furthermore, in the all important matter of certificates of public convenience and necessity decisions are usually made contingent on public hearings at which applicants for such certificates, other agencies of transportation serving the same territory and the general public are given full opportunity to present facts and opinions on the subject.

Up to this point in the discussion the entire subject has been approached from the standpoint of the state's power. It is now desirable to look at the question from the side of the operator of a motor vehicle common carrier, especially to learn what steps he must take in order, either to stay in business after a state adopts the policy of regulation or enter the business anew.

In a few states, as New Hampshire, for instance, it is only necessary for the operator to obtain a permit from the state authority. This is the rare exception, however, rather than the rule. In nearly every other state a certificate of public convenience and necessity is required; while in Colorado, New York and Wisconsin a permit from the governing bodies of the municipalities in which the common carrier seeks to operate must also be secured.

In several states motor vehicle common carriers established at the time the law first went into effect have been expressly exempted from this requirement making it necessary for none but operators beginning business after the passage of the law to obtain certificates of public convenience and necessity. In Connecticut, however, and in general in every other state, established, as well as new motor vehicle common carriers, have been obliged to demonstrate to the state agency their right to exist after the state control act has been written into the statute books. Obviously, this has very often meant real hardship to those who have invested substantial sums of money in motor vehicles and have built up paying businesses over certain routes only to be obliged to abandon everything.

While in the imposition of annual registration fees and other forms of taxes upon motor vehicles, state legislatures have in only a few cases discriminated between motor vehicle common carriers and private carriers, nevertheless, they have drawn a sharp line between motor vehicles used privately by their owners and those operated for hire.

By way of illustration, in Maine a motor vehicle used for hire must pay pay twice the normal annual registration fee for the class of vehicles to which it belongs. No extra or special charge, however, is made when this vehicle is engaged in the common rather than the private carrier business.

It will be noted from the seventh column of the tabulation that in practically every case where there is state regulation this course pursued and special and greater fees in lieu of the regular annual registration fees are im-

posed or else extra burdens are added to those usually imposed by the state on motor transportation.

In connection with the foregoing discussion it is of interest to note that the laws of Colorado expressly authorize the municipalities of the state to acquire, own and operate motor vehicle common carriers, while in Connecticut the street railway lines are given this same power with respect to passenger-carrying motor vehicles.

Another point worth noting is that while some states have not gone so far as to place motor vehicle common carriers under the full regulation of a state agency of government, nevertheless, they have enacted laws with a measure of such control in view. To illustrate: In Louisiana a statute approved in 1918 defines a power driven vehicle carrying passengers or freight for hire over the highways outside of incorporated municipalities as a "Service Car." Operators of service cars are obliged to procure from the police juries of the parishes in which they reside, certificates of their ability and skill to operate and furnish indemnity bonds against claims arising from injury to persons or damage to property.

A variation from the type of local control exemplified by Massachusetts is that which obtains in Delaware, where the Wilmington Board of Public Utility Commissioners has, with regard to motor vehicle common carriers transporting persons, prerogatives and exercises functions similar to those set forth in this report for the general form of state control.

As has already been observed, the power of the state agency exercising control is usually laid down in the law in general language which is generally so broad and comprehensive that it covers every possible phase of the motor vehicle common carrier business. This control then finds concrete expression in rules and regulations promulgated by the state agency from time to time as occasion warrants. For instance in Nebraska the Nebraska State Railway Commission entered an order on May 21, 1919, that beginning July 1 of the same year, the motor vehicles holding themselves out to carry freight for hire in a certain portion of the state should establish, maintain and apply a prescribed schedule of rates on freight to be classified in accordance with so-called General Order No. 24. In no other portion of the state nor in any

other particular did the commission assert its prerogatives. Furthermore, on April 20, 1921, it rescinded and annulled this order.

As an illustration of an entirely different tendency, in Washington state, where the law placing motor vehicle common carriers under control of the Department of Public Works went into effect last year, General Order M. V. No. 1, issued June 9, 1921, provides a very elaborate set of "rules and regulations governing the transportation of persons and property for compensation over any public highway." These cover the procedure for obtaining a certificate of public convenience and necessity for a certain number of prescribed vehicles; what must be done for permission to operate more vehicles in case of emergency; the sale, transfer or mortgaging of certificates; passenger and freight tariffs; rates; free passes; schedules, including changes in or discontinuance thereof; liability and property damage insurance; obligatory equipment including necessity to carry extra tires, speedometers, heating system for passenger carrying vehicles, fire extinguishers, route signs, etc.; operating regulations including in addition to the requirements of the state motor vehicle law, provisions as to the character and conduct of drivers, taking on of passengers and seating thereof, baggage, comfort stations, etc.; fees additional to the state registration fees; annual reports, etc.

Any discussion of state regulation of the motor vehicle when used as a common carrier would be incomplete without reference to the arguments for and against such regulation. In so doing, however, the opinion frequently expressed that railroad and trolley companies, as a result of the severe competition of motor transportation, are seeking state regulation as a means of killing off such competition, will be totally disregarded, and only such arguments recorded as are predicated on public welfare, sound economics and strict impartiality.

Arguments Pro.

With these premises therefore those who contend for state regulation say that such control is necessary:

(1) Because motor transportation for hire is a public utility and as such should be regulated along with other public vehicles so that travelers and shippers by

(Continued from Page 179.)

cultivation, by enabling farmers, gardeners and dairymen to get their goods to the city markets with an ease, promptness and inexpensiveness that were never before possible or even dreamed of. Their services in the transportation of freight and also of passengers have practically extended the suburban zone of every city tenfold. The producer fifty miles away can now get his goods to market as readily as could he in former years who was only five miles away.

"Motor vehicles of all kinds should doubtless be subject to taxation, on equal terms with other comparable property. The operation of them should, of course,

be resolutely though reasonably regulated. But there should be no special discrimination against them. They serve the whole public, and the whole public, which benefits from them, should be interested in providing good roads for them to traverse. There would be no more justice in making vehicles pay all the cost of the roads which they use than in making the people whose houses were saved from burning pay the cost of the fire department, or those who directly enjoy the protection of the police to pay for the maintenance of that force. Good roads are a public work, just as much a charge upon the whole public as the police or the schools or any other department or function of government."

such means can be made sure of safe, prompt, regular, adequate, efficient and economical service.

(2) So that, in all cases where motor vehicle common carriers come, or are likely to come, in ruinous competition with other common carriers, the state can step in and determine whether public convenience and necessity require such competition, and save, if desirable, the pre-existing agencies of transportation.

(3) In order to shoulder upon the motor vehicle common carrier obligations, financial and otherwise, in return for the rights given it to operate for a profit over all or certain highways within a state especially so since the highways are built and maintained by the public. In some cases these rights take the form of valuable franchises which virtually grant monopolistic privileges over certain routes.

(4) For the purpose of eliminating the irresponsible, so-called "fly-by-night" companies and individuals who, while undergoing certain destruction for themselves, pull down with the ruin well managed motor transportation agencies which render a real public service and are entitled to a reasonable return on their investments and a stabilization of their business.

Arguments Con.

In objection to these arguments for state regulation of the motor vehicle common carrier, opponents of the proposition maintain:

(1) That granted motor transportation for hire is a public utility, public interest can best be served by unrestricted competition and complete freedom from regulation in which none but the fittest can survive. This policy they contend will yield to passengers and shippers the maximum of results with the minimum of cost.

They deny any analogy between motor vehicle common carriers and railroad and trolley transportation agencies, pointing out that the latter by virtue of private ownership of franchises, rights of way, road beds, tracks and terminals have an exclusive and monopolistic control over all transportation on their routes. Motor truck operators, on the other hand, even where granted a monopoly of transportation for hire over a certain prescribed highway or portion thereof cannot deny the use of that highway to others who wish for themselves or as private carriers to transport persons or property over those same routes.

Finally, they point out that governmental regulation of rail and trolley common carriers came after these agencies had abused their rights and privileges and through pools, stifling of competition, exorbitant increase of rates, discrimination, stock watering etc., made it necessary for the public in self-protection to subject them to control. By the very nature of the service these evils are impossible with motor transportation since the road is free to the use of everyone and motor vehicles the medium for transportation over the roads are quickly, cheaply and in unlimited numbers available for everyone.

(2) Since the obvious outcome of the first argument advanced against state regulation is "cut-throat" competition between various forms of transportation attempting to serve a certain territory and per se between the motor transportation companies themselves operating in competition over certain highway routes, the opponents of state regulation cannot escape the query whether they are willing to face the logical consequences of such a struggle. Without hesitation they answer that wherever rail, trolley or any other form of transportation for hire cannot stand up before a newer and better form, public interest demands that it should give way; likewise within that newer and better form of transportation, the rule should be survival of none but the most efficient and economical agencies. They are confident that even though such a policy may mean the destruction at times of more or less invested capital, as it did when rail and inland water transportation first came into acute competition, the final economic benefits to the community as a whole will many times compensate for the loss involved.

(3) As for shouldering upon motor transportation for hire financial and other burdens which it should rightly carry, opponents of state regulation say that legislative bodies have not heretofore found it necessary to establish such control in order to determine the weight limits for motor vehicles used as common carriers; their registration fees and other charges; their liability to the public for injury to persons or damage to property; etc. If this is all that is involved it is not sufficient to warrant almost unlimited regulation in all other respects by a state agency.

(4) Lastly those against state regulation believe that the natural working out of economic laws will do more to stabilize the motor transportation for hire business than extensive interference on the part of governmental agencies of any sort. They feel that the proposition is paternalistic and will result either in discrimination in favor of one or more types of transportation, and against all the rest, or else that it will promote monopolistic advantages for certain motor transportation companies and that through it all the traveling and shipping public will pay the cost.

Pending Legislation.

In even numbered years the activities of state legislatures are relatively light since no more than 11 or 12 state law making bodies get together in regular session while few of the others meet in special session. Notwithstanding this fact 1922 is producing a big crop of bills dealing with motor vehicle common carriers. The Arizona state legislature now in special session and the current regular sessions of the Maryland, New Jersey and New York state legislatures are considering extensions of the existing powers of their state agencies exercising control over motor vehicle common carriers. On the other hand in Kentucky, Massachusetts, Mississippi, Rhode Island, South Carolina and Virginia where the state legislatures are in regular session,

and where as yet there is no such regulation, many measures aiming to bring about a greater or less amount of such control are now receiving the careful consideration of the legislators.

In this connection it is interesting to note that in New Jersey the strongest and most active opponents of state regulation and the extension thereof, have introduced and are striving to bring about exclusive power in the premises for the local incorporated municipalities. Apart from any other arguments pro and con for such local control, it must be apparent that the operation of a motor vehicle common carrier beyond the confines of a single municipal jurisdiction of a state becomes extremely complicated and burdensome under such circumstances and is likely to suffer from the varying policies of constantly shifting local governing bodies.

Another interesting movement to note in some states is proposed legislation to require every common carrier motor vehicle engaged in the transportation of passengers to have both a front and rear entrance, while in Maryland a pending measure would require not only a chauffeur but also a conductor on every such vehicle. This would seem to indicate that some state law makers seek to rewrite in motor bus transportation the full crew laws which for a long time have been an economic burden for the railroads.

Position of Conference Committee.

The motive of this discussion of state regulation of motor vehicles used for hire is informative only. It is not intended and in no way must be regarded as favoring either one side or the other of the question. For this reason the conference committee will appreciate greatly any information; arguments pro and con; comments; corrections or criticisms which all those who read this discussion may have to offer, especially if such material includes the practical experiences that have resulted from regulation by the states where it is now in force. How important this is can be seen from the fact that in 1923 the legislators of 42 states will meet in regular session and doubtless be called upon to make decisions on scores of bills vital to motor vehicle common carriers. The conference committee hopes at that time to be of service in laying before all concerned facts and arguments which will facilitate the passage of only such laws as are scientifically correct and fair alike to motor vehicle common carriers and the public.

From a preliminary report based on state laws in force Jan. 1, 1922, and on bills pending before state legislatures in session March 1, 1922.

Publication authorized by Motor Vehicle Conference Committee, 366 Madison avenue, New York.

American Automobile Association, Motor & Accessory Manufacturers Association, National Automobile Chamber of Commerce, Inc., National Automobile Dealers' Association, Rubber Association of America, Inc., Trailer Manufacturers' Association of America.

(Continued from Page 216.)

instantly indicated by the Vacuumeter. Long before an engine can score its cylinders, burn out bearings or suffer other damage almost beyond repair, the Vacuumeter has shown that there is something wrong and has also shown exactly what the trouble is.

Reading the Vacuumeter.

The window marked "vacuum" changes from white to red with every operation of the vacuum tank, remaining red a duration of time necessary to transfer a charge of gasoline from the supply tank to the vacuum tank. A complete "red signal" gives you positive assurance that the vacuum system is in proper function. Leaks, obstructions, flooding or other faulty performance are shown by various other signals.

The amount of gasoline removed from the supply tank is automatically subtracted, leaving under the word "tank," the remaining amount of gasoline in the supply tank. And since the amount removed has been consumed, it is added to the reading of the window marked "trip." The "trip" window is set O O O at the beginning of a trip, just as the speedometer has been set, and as a speedometer reading is in miles and tenth miles, the Vacuumeter reading is shown in gallons and tenth gallons. A mental operation of division, the one into the other, enables you to know the exact mileage per gallon of gasoline used. As the gasoline is used in fractional parts, the total amount of gasoline consumed is accumulated under the reading marked "total," which cannot be reset.

What is the cost of faulty gasoline performance? What does the gallon of gasoline give you for the money you give for it? Each gallon should contain the same fuel energy. Where maximum fuel energy is not delivered, maximum economy cannot be enjoyed.

Development of the "Vacuumeter."

An accompanying illustration shows the evolution of Mr. Albright's inven-



J. R. Dangler, Vice President, Secretary and Treasurer Vacuumeter Manufacturing Corporation.

tion, which caused him deep concern in the early stages of development. The last year, however, has been devoted to perfecting the instrument, and letters patent have been granted on every step as a precision instrument by the United States and Canadian patent offices, with patents pending in the principal foreign countries.

Due to the variation in vacuum feed systems of the amount of gasoline drawn from the supply tank with each operation, it was of course necessary to first take into consideration a positive means of calibration. In certain other attempts at the construction of a gasoline meter, the engineers have employed ratchet systems. But with a ratchet the reading depends upon a tooth by tooth operation. Where the amounts of fuel varied, accuracy could not be obtained because it is impossible to split a tooth in a ratchet. Mr. Albright soon found that it would be impossible to use ratchets in the construction of the meter and as a result the battle with calibration began. After exhaustive tests in which discouraging disappointments naturally arose, he finally perfected the present positive clutch which makes it possible to measure the fuel to the drop.

It is easily seen by the accompanying photograph that many changes were made not only as to the internal construction, but the exterior appearance of the meter as well. The original meters registered only the trip and total consumption, the trip window indicating the gas in gallons and fractional gallons. But throughout the progress the meter began to look more presentable as the photographs show.

While the "Trip" and "Total" windows furnish almost indispensable information, the additional advantage that would be derived from showing the exact amount of fuel in the supply tank at all times soon became apparent. It was this thought that brought into existence model "C" and with it the window marked "Vacuum" to give the owner the

assurance that his vacuum feed system was in proper function, reporting each individual operation and instantly showing faulty performance when it occurs. This gives the meter, as will be seen in the photographs, four very necessary window readings as against two in the original meter.

At first thought Mr. Albright did not realize the magnitude of the task before him, but, he soon discovered that it was a gigantic undertaking, requiring the expenditure of much money to properly develop what he knew was the one missing link in the operation of the automobile. At this stage of the work he secured the interest and financial support of James H. Farish and B. Crawford Jenkins, both of Columbus, Ga., and through the untiring efforts of this trio nothing was allowed to interfere with the progress of the work. Mr. Albright traveled throughout the automobile belt contracting for odometer construction, at which time the Van Sicklen Company of Elgin, Ill., the Veedor Company of Hartford, Conn., and the Elgin Company of Elgin, Ill., were given contracts for the manufacture of odometers and dials, and at the same time the Allemitte Company of Chicago built the dies for the various parts, these dies having a factory capacity of 1000 parts per day each.

A copartnership was then formed between the three original persons and while the organization did not have the general business administration necessary to the undertaking of production and distribution, it was successful to the extent that some 25,000 meters now are successfully operating on automobiles throughout the United States. In less than three years, with an original investment of \$4000 the business grew to a point where they could show tangible assets well in excess of \$100,000, having at that time a factory output of 1000 finished units daily.

Distribution so taxed production that it was soon evident that a general reorganization would have to be made and

(Continued on Page 226.)



James H. Farish, Vice President and Director, Vacuumeter Manufacturing Corporation.



B. Crawford Jenkins, Director of Vacuumeter Manufacturing Corporation.

MOTOR TRUCK MARKETS ABROAD

PROSPECTS are generally good for the sale of motor trucks in Brazil, especially in the 1½ ton size, according to recent consular reports received by the Automotive Division of the Department of Commerce. Contingent factors, however, are the betterment of exchange and the improvement of roads. While business is improving slowly, the demand for mo-

tor trucks in Sao Paulo, of which there are about 800 in the district, will continue to increase as there is a decided campaign on for the improvement and building of roads. The city of Sao Paulo is more or less the industrial center of Brazil and motor trucks are much used there, although it is only within the last few years that this has been true.

WHILE at present and for a time to come Bahia offers a poor market for motor trucks, there should be a fair demand for heavy service trucks when the exchange becomes normal, although the high price of gasoline and cheapness of labor are serious drawbacks. Great quantities of heavy goods, such as hides, skins, cocoa, sugar and tobacco are constantly being moved from the warehouses to docks. At the present time this merchandise is transported by small two wheel carts capable of carrying about one-half ton each and, on account of the large number required to handle the business, the traffic is often blocked. There are not more than one dozen trucks now being used in Bahia.

The market for motor trucks in the Rio de Janeiro district is limited to the city of Rio de Janeiro, the main hindrance of the greater use being the lack of roads outside of the city. The interior traffic is practically limited to oxcarts, the roads being unfit for automotive vehicles. Trucks sold in the city of Rio de Janeiro are mostly one and a half ton capacity. The seven ton type may be classed second, with the two, five and three ton models next in the order named. The number of trucks in the district is estimated at about 500.

At present, depressed financial conditions prevail in the Porto Alegre district and the importation of motor vehicles has been reduced materially. Even in normal times, owing to the lack of good roads, the demand for motor trucks in this district is limited, and their use is almost exclusively confined to the larger cities. The majority of trucks are of the 1½-ton size, equipped with bodies constructed

locally as a usual rule.

Argentina Imports Improved.

The demand for moderate and low-priced motor cars in Argentina is improving, say a cable to the Department of Commerce from Commercial Attache Feely at Buenos Ayres. March imports from the United States of passenger cars not including Fords, totaled 301, chassis 3, and motor trucks 3, as against 42 passenger cars, 28 chassis and 8 motor trucks from Europe. 216 cases of accessories reached the country. 64 motor cars of American and 22 of European makes were imported during the corresponding month last year.

United Kingdom Market Glutted.

The market for motor trucks in the United Kingdom is decidedly unfavorable, the most important factor contributing to this condition in England being the oversupply on account of the surplus army stocks at Slough in Berkshire and the policy of the Government in realizing on these supplies on the deferred payment basis. Agents of motor trucks manufacturers state that at the present time they are utterly unable to move their stocks because of the far more advantageous price and credit terms being offered by the Government, which is selling reconditioned trucks with a six month's guarantee, as low as £50, whereas local dealers have had stocks on hand for over a year which they offer at £700 to £800.

The market in Scotland is depressed as a result of the general stagnation in trade and industry, and, until the hoped for revival is apparent, the prospects for the sale of motor trucks are not encouraging. In this section of the country, the demand will be chiefly for the heavier types, while the light deliv-

ery wagons are enjoying increasing popularity, according to report from Consul Johnson, at Dundee and Consul Chamberlain, at Glasgow.

Conditions Unfavorable in France.

The sale of American motor trucks in France is greatly hampered at present not only by the French import duty of 45 per cent ad valorem, but also by other adverse circumstances as reported below:

The difficulties in the Lyon district, says Vice Consul Fullerton, are due largely to the depreciation of French exchange, the activity of French truck manufacturers, who are able to promise immediate delivery (the Berliet factory has its plant at Lyon), the existence of large army stocks and the alleged inadequacy of repair facilities for American cars resulting from the lack of spare parts and experienced workmen. It is believed, however, that connections made now will be of value in the near future.

Owing to the exceedingly high price of gasoline, motor trucks are being used to a very small degree in the Limoges district, according to Consul Delisle, and industrial firms are unwilling to substitute the motor trucks for the horse until the cost of fuel is reduced. Consequently, large quantities of raw materials and finished goods are now being carted to and from the railway stations to all quarters of the cities by horses, and some large trucks were purchased from the American army stocks, while the number of lighter models is negligible. There will be little opportunity for the sale of motor trucks for several years to come.

The very small demand in the Nancy district is due, in a large measure, to the liquidation of army

stocks, and, as long as the general depression lasts, no improvement in the motor truck market can be expected. The 1½ and 5-ton trucks, with low gasoline consumption, are preferred.

Better Prospects in Straits.

During 1921, the market for motor vehicles was exceedingly dull, due to the slump in rubber and tin, and there was practically no importation of motor trucks. The current year will, undoubtedly, witness somewhat better conditions, says Consul McNiece, at Penang.

A great deal of the hauling in the Straits Settlements is done by ox-carts and hand carts, which is a very tedious and slow method, but comparatively cheap. While there are excellent roads throughout the Colony and the Federated Malay States, those on the private estates

are not fit for the use of motor trucks. Many hired cars traverse the roads carrying both passengers and produce of all kind. As most of these cars are in a disreputable condition, it would appear that they might be superseded by motor trucks; none of the latter, however, have been introduced during the past year. At present, there are only about 50 motor trucks in Penang.

Asia Minor Market Depressed.

At present the truck business is exceedingly dull, due to the unsettled conditions throughout the Near East. An attractive field for the sale of all kinds of automotive products will, undoubtedly, be offered in Asia Minor, according to Assistant Trade Commissioner Gillespie, at Constantinople, when

peace is reestablished and the several trade routes leading out of Constantinople are reopened.

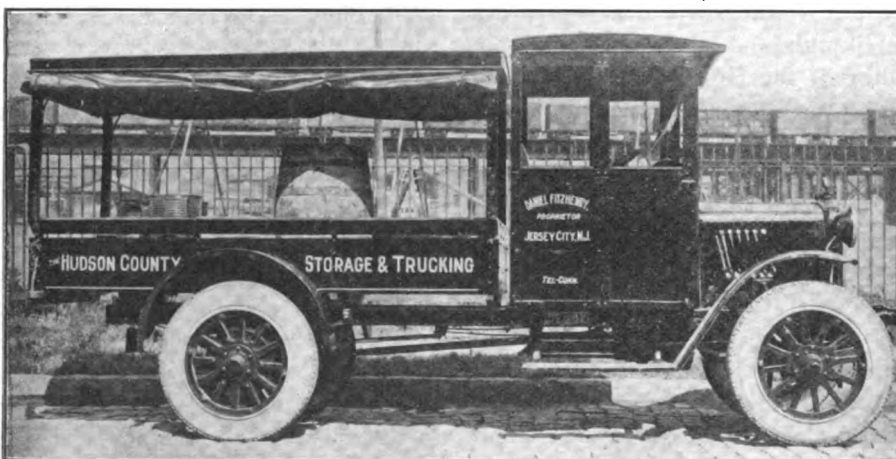
West Africa Market Promising.

British and French West Africa have begun to import trucks to a considerable extent, says Consul Yerby, in Senegal, and, while money at present is scarce, importers are quite prepared to do business. Trucks are used in collecting the raw products and transporting them to the railway, river and shipping stations, and for the distribution of imported goods. The sea-ports have begun to use trucks almost exclusively for hauling, instead of the old method of head carriage. The one-half, one and one and a half-ton trucks are those preferred. In most of the colonies heavy trucks are prohibited by law.

DENBY THREE-QUARTER-TON SPEEDSTER

THE Denby Motor Truck Co., Detroit, Mich., announces that they are now in production with a speed truck which has a pay load capacity of ¾ to 1¼ tons. The truck does not materially differ from former models made by this company except that it is lighter in the units and is equipped with lighting equipment and magneto ignition.

Statement is made that all experimental chassis of this model are required to secure at least 16 miles to the gallon of fuel under all load and road conditions, that they are further required to reach 30 miles an hour in intermediate gear and better than 40 miles an hour in high gear under full load.



Economy of Operation Is Claimed for This Three-Quarter Ton Speedster.

POWER is furnished by a Red Seal Continental four-cycle, four-cylinder vertical engine developing under S. A. E. rating 22.5 horsepower, while at normal speed 32.5 horsepower is developed. The engine is suspended at three points by two arms cast integral with the crank case at the rear and a single

trunnion bearing at the front. The bore is 3½ inches and the stroke five inches. The crankshaft is made of special alloy steel of 90,000 pounds per square inch tensile strength and is fitted with three main journals of extra size. The connecting rods are extra large to give added strength while the valves

are 1¾ inches in diameter, having unusually large clearance. The engine equipment consists of a one-inch Stromberg carburetor, Eise-mann high-tension waterproof magneto, Bijur lighting system; the oil system is force feed and splash by means of a plunger pump to all internal bearing surfaces.

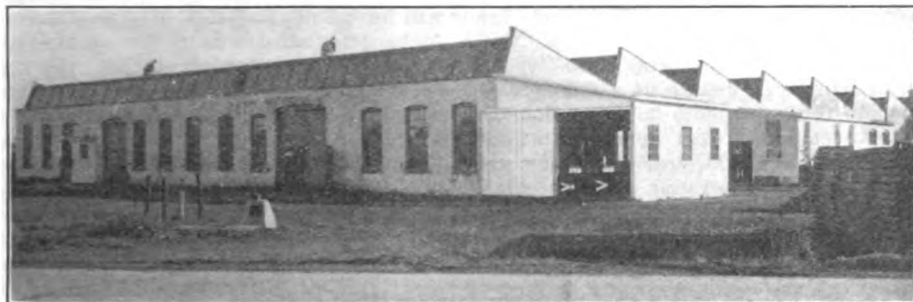
A Monarch governor holds the speed normal at 35 miles per hour, which is considered a consistent speed for this capacity truck.

Thermo-Syphon Cooling System.

The cooling system is thermo-syphon, having a large 16-inch fan mounted in the rear of the radiator and mounted on annular ball bearings. The radiator is an extra large built up type, having cast top and bottom tanks.

The clutch and transmission are in unit with the engine with the clutch enclosed in the standard S. A. E. flywheel bell housing. The

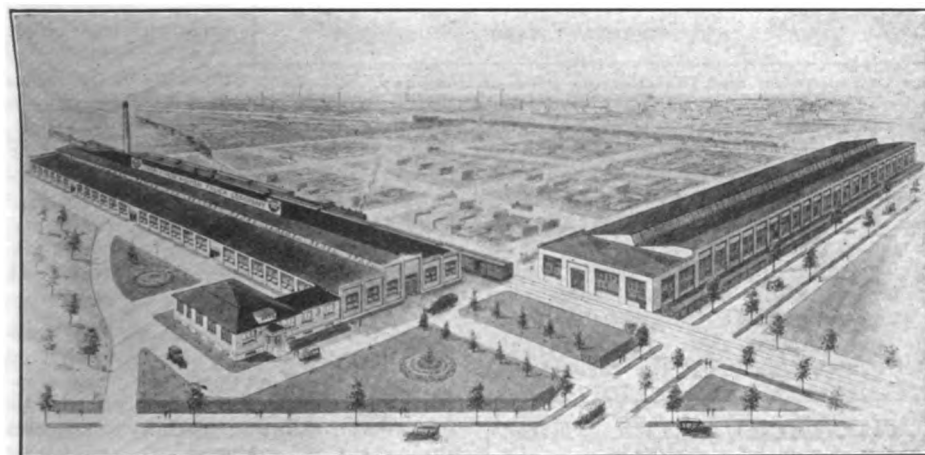
HOMES OF INDUSTRY



Motor Driving-In Plant, Republic Truck Company.



Home of Witherbee Storage Battery Company, Inc.



Where the Winther Motor Truck Is Manufactured.

clutch is a multiple disc dry plate type faced with raybestos lining on alternate discs, enclosed and free from dust. The transmission is equipped with three forward selective and one reverse speeds, while propeller shaft is of tubular steel $2\frac{1}{2}$ inches in diameter with $\frac{3}{16}$ -inch wall. Two enclosed metal universal joints connect the power plant with the rear axle, which is a straight bevel gear drive live axle type, affording ample reduction for truck requirements. The Hotchkiss method of final drive is used instead of torsion rods, which is claimed to prevent the unsprung weight of the chassis from affecting the chassis

units in any damaging way.

Frame Is Pressed Steel.

Both the service and emergency brakes are located in the rear wheel drums, the service brake contracting on the outside of the drum and the emergency brake expanding on the inside. The front axle consists of a heavy drop forging I-beam construction, while the front and rear springs are semi-elliptic, the front springs being 44 inches in length by $2\frac{1}{2}$ inches wide and the rear springs 48 inches long by $2\frac{1}{2}$ inches wide, each bushed with high grade bronze bushings. The frame is of pressed steel construction, heat treated, hot riveted and gusseted, reinforced

with cross members and all joints hot riveted. The depth of the channel is $4\frac{7}{16}$ inches, three inches wide, $\frac{3}{16}$ inch thick and the width of the frame is given as 34 inches.

Artillery Wood Wheels.

The wheels are of wood artillery type equipped with cord pneumatic tires of special truck construction 35 by five inches front and rear.

The steering gear is located on the left side of the driver's seat with gear shift and emergency brake levers at the driver's right in the center, the spark and throttle control are mounted on steering wheel with foot accelerator on the floor boards.

The body allowance is 800 pounds, length of frame back of seat 98 inches, road clearance $11\frac{1}{2}$ inches and the tread 130 inches with track of 56 inches.

The regular equipment consists of electric horn, electric head and tail lamps, generator and storage battery, motormeter, bumper, high pressure grease gun, tool kit including hand pump and jack. The price f. o. b. Detroit is \$1625.

DEARBORN TRUCK DISTRIBUTOR TAKES ON CAR.

John F. Toman Sons Company, the oldest and largest dealers in accessories in Trenton, and agents for the Dearborn truck, have contracted for Anderson distribution in Trenton and several counties in central New Jersey. They started off at the time of the Trenton show, displaying three Anderson cars, together with a specially prepared Coachbuilt body. A red ultra sport in the Toman booth was quite the talk of the show.

JERSEY FERRIES HELP TRUCK OWNER.

NEW YORK, APR. 14.—Plans for another ferry to connect Staten Island with New Jersey, proposed to run between St. George and Keyport, on Raritan Bay, are being made by the New York and New Jersey Steamboat Company. This is the second ferry planned to be operated across Raritan Bay, the other one being for service between Totenville and South Amboy. Both are being promoted to improve motor traveling facilities. Former seasons have shown that ferry conditions between New York and New Jersey are inadequate.

Michael W. Gaffney, formerly associated with the Haynes Automobile Company, Kokomo, Ind., is now body engineer for the Briggs Manufacturing Company, Detroit.

Distribution will be handled through

Advertising will be handled through

The annual quotas of the exclusive distributors are based on car registrations in their respective territories and after establishing these distributors the sales promotion department of the corporation will go right into the business of the distributor, taking complete charge of his Vacuumeter business through the educational period. During this training his sales department



the Schulte-Tiffany Company, a Cleveland advertising agency, well known in the national advertising field. The national as well as local advertising appropriations are very substantial, and advertising plans are being worked out in very careful detail. The sales promotion department has worked out some very comprehensive and attractive "dealers' helps" ideas that will directly aid distributors throughout the country.

will be educated in the field, thus actually making a stock turnover for the distributor while the practical operations department is educating the mechanical staff of the distributor in the care and repair of vacuum feed systems, installation of the Vacuumeter and other details pertaining to the work.

The personnel of the sales and practical operations staff is to be recruited from a sales school operated by the company and among the sales staff will be many well known specialty salesmen throughout the country. The names of these individuals also will be announced in the near future.

The distributors will be given every assistance, especially in the general advertising and publicity work, as this will all be done on a standardization basis.

Pahaskee Teepee, the Buffalo Bill Museum in Denver Mountain Parks System, contains the knife which Colonel Cody scalped Yellow Hand, the Sioux chief, after the Custer massacre, and the gun with which he killed 4,000 buffalo in one year for the Union Pacific road.

Rocky Mountain National Park, in Colorado, had 273,737 visitors from every state in the Union last year, which was more than the combined attendance of Yellowstone, Yosemite, Glacier, Grand Canyon and Lassen National Parks.

Colorado has the highest yacht anchorage in the world at Grand Lake at an altitude of 8369 feet, where a regatta is held every summer for a Lipton cup.

If the fuel system is out of order it points out the trouble instantly in advance of actual damage to motor, or waste of fuel.



"I FIRMLY believe that more than 90 per cent. of all the people go through life arguing about things of which they know nothing," said O. M. Vett, disgustedly, throwing the newspaper he had been reading into the waste paper basket."

"Meaning what?" I asked solicitously.

"Everything in general, probably," grunted Vett, "though what I referred to, specifically, was that article I was just reading. Fellow who wrote that may have had a good education and all that, but he didn't know what he was writing about—that's certain.

"He went on to tell about the great harm that the motor vehicles were doing to the highways, and cited cases to prove his contention. Probably in that part of his story he was right enough. The present system of roads was not constructed to handle any such traffic as they have today. That isn't the fault of the old road builders nor the fault of the automotive industry, but is something unforeseen that is being remedied very rapidly.

"What I took exception to was his tirade against the motor truck and automobiles. It always makes me mad to have illy prepared people in responsible positions coming out in print with an argument that I know is all wrong. In this case the writer tells about the motor trucks and automobiles not being taxed enough to pay for the upkeep of the highways. I can stand to have him talk about the way the heavier trucks tear up the roads, although both you and I know that they really don't do them any particular damage at that, but when he tells about how they don't pay their share of the upkeep of these roads I get good and sore. You understand,

don't you?" he asked, fixing me with a penetrating gaze.

"Well," I said, "in a way I do. I suppose these cars and trucks pay a fair proportion of the upkeep of the highways if that is what you mean."

"A fair proportion," wailed Vett. "That's just what I was talking about—the ignorance of the general run of people. And now I get up against you—a man in the business, and even you don't know any more about it than a man who never ran a machine. As a matter of fact do you believe that the automotive industry not only pays all the upkeep of these highways, but a whole lot more beside—almost double the cost of this maintenance, in fact?"

I didn't believe it and said as much.

"I might have known it," grieved Vett. "I did think, though, that you at least would be wise to the facts. Well, anyway, the automotive industry, aided by sun, rain, wind, general erosion, horse drawn vehicles and a whole lot of natural causes 'destroyed' the highways to the extent that \$180,000,000 were needed to keep these roads in good shape last year. In other words, that sum represented the total cost of maintenance. And the automotive industry, alone and unaided, paid in the form of special taxes, a total of \$337,046,249, nearly double what it cost to keep these roads in shape."

"I wouldn't have believed it," I said incredulously.

"Course you wouldn't, neither would anyone else who hadn't taken the trouble to find out about it," said Vett. "I have here a clipping from a booklet issued by the National Automobile Chamber of Commerce, which as you know is considered an authentic authority on questions connected with the automotive industry. I'll read it to you," he said, as he adjusted his spectacles. "Listen—

"The amounts are as follows:

"Federal excise tax, passenger cars, \$64,388,184.

"Federal excise tax, motor trucks, \$11,640,056.

"Federal excise tax, accessories,

parts, tires, \$39,518,009.

"State motor vehicle registration fees (estimated), \$125,000,000.

"Personal property taxes (estimated), \$75,000,000.

"Gasoline tax in 15 states, 1c and 2c per gallon, 1922 (estimated), \$10,500,000.

"Local motor, franchise, mileage, business, etc. (estimated), \$10,000,000.

"Municipal registration and license fees (estimated), \$1,000,000.

"Total, \$337,046,249."

"I wouldn't have believed it," I said incredulously.

"So you said before," laughed Vett, "but now that you know it—go and spread it a bit."

"I will," I promised—and I am, as this story proves.

MOTOR TRANSPORT IN GREAT BRITAIN.

Railway companies in Great Britain are being offered serious competition by motor highway transport, which is making great headway and is viewed with considerable alarm by railway officials, according to reports received by the Automotive Division of the Department of Commerce. High railway rates, an excellent system of highways and the release of large numbers of motor vehicles formerly used for military purpose, together with the men who drove them, all combined with a winter climate not unduly severe, serve to advance this competition. However, in some quarters its importance is thought to be overestimated, because motor traffic will ultimately be compelled to bear its proportion of taxes for maintenance of the highways; furthermore, doubts exist as to whether any of the motor transport companies are setting aside the proper sums for repair and renewal of vehicles.

The number of road transport undertakings in operation in 1921 was 3000, with a capital of £117,000,000, exclusive of business men who use their own fleets of motor trucks. A recent press estimate of merchandise hauled by road transport in the United Kingdom in 1921 was 6,000,000 tons.

History of Rubber

This Article Tells in an Interesting Manner How It Was First Discovered, Methods of Propagation and Present Status of the Industry.

THROUGH one of those mysterious coincidences so nicely timed that they are regarded by many as a distinct act of Providence, there were set in motion in the early seventies two separate activities which were to coalesce more than a generation later and make possible the great automobile industry of America and the attendant tremendous expansion of

the rubber and petroleum industries. One of these activities was the effort of Selden to produce an automobile engine. Here was the inception of what has been termed the most gigantic mechanical enterprise of the ages. It took many years for the flower to bloom; but from the day of those first experiments the advent of the automobile was constantly imminent.

AS IF the unseen forces that guide human affairs were fully cognizant that within a brief period this effort of Selden's was to blossom fully in the great automobile industry of today, another man in another quarter of the globe, and with no thought of the automobile in mind, took at about the same time the steps which have made it possible to furnish for that industry the large supplies of rubber on which automobiles are so vitally dependent.

What the automobile would be without rubber tires would be hard to imagine. Without rubber, some automobiles would undoubtedly be manufactured, but they would certainly be rattlebang affairs of slow speed and much vibration. It is quite true that following the invention of a successful engine, automobile development has been conditioned very largely upon the development of tires. This fact was amply demonstrated through the revolutionary changes which took place in motor truck construction due to the adaptation of the pneumatic tire to use on motor trucks. Germany had a chance to find out what automobile operation without rubber tires was like during the war, and she did not relish the experience.

It is the purpose of this article to show how it happened that when the automobile industry burst upon the world, with a need for rubber which the recognized sources of supply could not have begun to meet, there was found ready in a new quarter a supply so adequate that the progress of the industry has not been halted for a second by any shortage of rubber. In other words, this is the story of the rubber plantations in the Far East.

Far East Produces Most Rubber.

Until 10 years ago, rubber meant rubber from Brazil. There were some other sources of supply of inferior grades, but practically all the prime rubber came from Brazil. Today Brazil's supremacy is gone. In less than a decade the Far East has jumped to the front, and is now producing nine-tenths of the rubber of the world.

The history of the passing of the glory of Brazil in this particular has a touch of romance in it. In the sixties an Englishman named H. A. Wickham spent

much time in Brazil in the rubber field. He conceived the idea that the rubber trees which grow wild in Brazil could be cultivated and grown on plantations. But he was ahead of his time, and found little encouragement.

Wickham finally enlisted the interest of Sir Joseph Hooker of Kew Gardens, London, who had been considering the possibility of introducing the trees to India. Hooker in turn interested the government of India in the project, with the result that Wickham was given a commission by the Indian government for the introduction of the Brazilian tree into India.

How to fulfill the commission was the problem. Hooker had already tried to effect it, but without result, in spite of the resources of Kew. Wickham was in Brazil when the solution of the problem suddenly presented itself. A large British steamer which had sailed up the Amazon on her first trip with a cargo of goods to be sold—it being the intention to load her from the proceeds with rubber for her return trip—found herself without funds and without a cargo, when the supercargoes, after disposing of the goods she had brought, decamped with the money. Wickham promptly chartered her in the name of the Indian govern-

ment and placed aboard her at a port a third of the way up the river several thousands of the seeds of the *Hevea Brasiliensis*, the rubber tree, carefully packed.

Concerned for Safety of Seeds.

"For my part," says Wickham in his memoirs, "as the fine ship sped on her way with my precious *Hevea*, so far safe aboard, slung up fore and aft in their crates in the roomy, empty forehold, I became more and more exercised and concerned with a new anxiety.

"We were bound to call in at the city of Para as the port of entry in order to obtain clearance papers for the ship before we could go to sea. It was perfectly certain in my mind that if the authorities guessed the purpose of what I had on board, we should be detained on a plea for instructions from the Central Government at Rio, if not interdicted altogether. I had heard of the difficulties encountered in the Clements Markham introduction of quinine trees into India in getting them out from the Montana of Peru. Any such delay would have rendered my precious freight quite valueless and useless.

"But again fortune favored. I had a 'friend at court' in the person of Consul Green. He quite entered into the spirit of the thing, went himself with me on a call to the proper official, and backed me up as I presented to His Excellency 'my difficulty and anxiety, being in charge of, and having on board a ship anchored out in the stream, exceedingly delicate botanical specimens, especially designated for delivery to Her Britannic Majesty's own Royal Garden of Kew. Even while doing myself the honor of thus calling on His Excellency, I had given orders to the captain of the ship to keep up steam, having ventured to trust His Excellency would see his way clear to furnishing me with immediate dispatch.' An interview most polite, full of mutual compliments in the best Portuguese manner, enabled us to get under way as soon as the captain had got the dingey hauled aboard.

"I got the captain to put me ashore at Havre and then posted over to Kew and saw Sir Joseph Hooker, so as to dispatch a night goods-train to meet the ship on arrival at the Liverpool docks."

CALIFORNIA SHOWS UNUSUAL INCREASE

CALIFORNIA has made rapid strides in the use of motor trucks in the last year. The registrations, just made public, show an increase of more than 105,000 machines. This showing, considering 1921 was supposed to be a period of depression, is remarkable. Up to Jan. 1 there were registered in California 638,922 passenger cars, 34,908 trucks, 17,603 motorcycles and 3404 trailers.

Sir William Thiselton-Dyer speaks interestingly of the next step:

Experiment is Successful.

"I can assure you that on that 14th of June, 1876, when Mr. Wickham arrived at Kew in a hansom cab with his precious box of seeds, not even the wildest imagination could have contemplated its results. I saw Mr. Wickham's seeds planted. We knew it was touch and go, because it was likely the seeds would not germinate. I remember well going into the propagating house on the third day they were planted and seeing that by good luck the seed was germinating. So rapidly did the plants grow—several thousand of them—that we had to have special cases made. On August 12th, 38 cases went out to Ceylon on a P. & O. steamer, in charge of a gardener. The whole expense of initiation and the whole burden of finance from first to last was borne by the India office."

The seedlings were sent to Ceylon because it was decided that the climate of the island was better suited than that of India for the rearing of the precious trees. The gardens at Heneratgoda, 16 miles from Colombo, were opened as their permanent resting place.

The first tree flowered at Heneratgoda in 1881, and in that year the first experiments in tapping began. The plantation was thinned out in 1882, and, in 1883, 260 seedling plants were raised, most of which were distributed in Ceylon. In 1884 there were over a thousand trees at Heneratgoda, but it was found necessary to thin the plantation again in 1885, and we read of 457 fine trees existing in 1887. In 1893 about 90,000 seeds were distributed to planters in Ceylon, and similar numbers were disposed of in the years immediately succeeding, the seeds being eagerly taken up at a price of 10 rupees—about \$3.20—a thousand.

From the few plants thus cared for in their youth, many of which have now grown to be monster trees, has sprung the whole of the Ceylon industry, as well as a great part of that existing further East.

Original Trees Still Stand.

In 1877, 22 trees reared in Ceylon were sent to Singapore in Malaya. Some were planted in the Singapore Gardens and the rest taken to Perak. Some of these original trees are still standing, and one of them is believed to be the biggest tree in girth yet recorded among the plantations. The trees fruited in Singapore first in 1881, and the seed was sent to Borneo and elsewhere. In 1891 samples of Malay rubber were sent to London and pronounced good, and in 1889 some sheets were sold in London.

The planters in Ceylon did not take hold of rubber planting with the same eagerness as did the planters of Malaya. In Ceylon they were making good profits in tea growing and had no need to make a change. But in Malaya the planters and the financial interests in Europe who had sent them out were sick to death of the struggle to make a living out of coffee, and, though in fear and trembling, began to plant this new thing, rubber, hoping if possible to save their estates from abandonment.

Lucky was it for Malaya that she fos-

FRENCH AERONAUTS HAVE FLYING AUTO

A FLYING automobile is the latest development in the French aero world. A successful demonstration of an ordinary automobile with folding wings, two engines, one of 10 horsepower for land going and the other of 300 horsepower for air travel, was recently held. The machine performed all the usual feats of an airplane and also of an automobile.

tered this new enterprise, for now within her territory lie the greater part of the rubber plantations of the world.

High Prices Bring Boom.

It was very difficult at first to induce planters in Malaya to look with favor on cultivation. Trees were planted wherever possible. At length, the sudden rise in the price of rubber, mainly due to the development of the automobile industry, forced the idea of cultivation on the attention of the planters and the investing public, especially that of Great Britain. A few pioneers began to cultivate their trees; and in a few years there arose a boom in cultivation, such as has never occurred in any other industry.

The plantation product first attracted serious attention in the manufacturing world about 1898; but it was not until 1905 and the two following years that the rush into rubber took place, which forms the most striking episode of this story.

To show how lightly the plantation product was regarded by European and American rubber manufacturers, it is only necessary to state that it took from 1900 to 1904 for the annual production of plantation rubber to grow from 4 to 43 tons. In 1907 the output reached 1000 tons; in 1911, 14,500 tons; in 1915, 107,800 tons, and in 1919, 285,225 tons. In comparison, the Brazilian output grew from 27,136 tons in 1900 until it reached its maximum of 42,410 tons in 1912, since which time the annual output has averaged about 35,000 tons.

The romance of plantation rubber is the old, old story, a few resolute men working in eastern jungles, having faith in the ultimate success of the work they had undertaken, and that of those daring to put their capital into far-away lands. It was but a few years ago that practically all the planters were feeling acutely the pinch for funds to tide them over the early stages of the enterprise. Many cases could be cited where 15 years ago \$25,000 to \$50,000 could not be found to carry on estates being planted in rubber which are valued today at four to five millions.

When a market for plantation rubber began to develop, the needy planters were astounded at the fabulous estimates

of profits which they figured out of their estates, and dared not present them to financiers until they had divided the probable profits by four. Even then, these estimates appeared in the light of a fairy tale, and London financial men shrugged their shoulders, buttoned up their pockets and thought they had done a good day's work when they had got rid of the importunate planter and his castles in the air.

Profits Cause Rush to Invest.

When the estimated profits began to be fulfilled, the British public rushed madly to secure an interest in every venture placed before them. They were as anxious to risk their money to get a share of the wonderful profits as are Americans today to part with their Liberty Bonds in order to partake of visionary dividends in alluring oil ventures. Conditions became such that respectable newspapers refused to carry any advertisements of rubber projects.

The excitement culminated in the historical and regrettable "boom" of 1910. By good fortune, the bubble was deflated without bursting, and now the financial affairs of the plantations are on a very substantial basis.

The area of plantation rubber in acres was 116,500 in 1905. In 1919 a fairly accurate estimate placed acreage at 2,910,750. While Europe—and especially England—was devoting its attention to the growing of crude rubber America was concerning itself with the production of rubber manufactures, and the success of the European investment in plantations has been a direct resultant of the enormous market created for rubber by the energy of American manufacturers.

American interest was attracted to the plantation industry in 1910, when the British and other Europeans had invested between three and four hundred million dollars in estates. The United States Rubber Co., the largest consumer of crude rubber in the world, was one of the first of the American concerns to investigate the possibilities and enter the field. The Dutch island of Sumatra was chosen for the company's activities. This American corporation has established there the largest single rubber plantation in existence. The tract contains more than 70 square miles of trees in a high state of cultivation and close to 20,000 employees are at work in the great orchard. The high standards of administration and scientific culture which have marked this project have implanted in the minds of the dwellers in that far eastern clime a thoroughgoing respect for American efficiency.

While the 10,000,000 cars and trucks of the United States skim along on their tires made of plantation rubber, one cannot but pause to wonder again at the curious coincidence that has made it possible to furnish in abundance the necessary rubber.

Few of the planters who embarked in the early days on the plantations venture had even heard of the automobile when they set out their trees. Those who had kept in touch with affairs in England might have heard of the horseless carriage preceded by a man on foot carrying a red flag as a danger signal!

ARVAC ADDS DISC JOINT

THE Arvac Manufacturing Co. of Anderson, Ind., announces the addition of the Arvac disc joint to the already well-established line of metal universal joints it has manufactured for five years.

THE new disc joint will be made in three sizes, intended to cover the entire passenger car, speed wagon and light truck field, and a large percentage of heavier truck installations between the clutch and transmission. As shown in the accompanying illustration, the design includes a centering member which, it is claimed, keeps the propeller shaft concentric at all times, and minimizes vibration by supporting the metal parts of the joint in a positive manner, causing them to revolve about a true axis—all of which tends to greatly increase the life of the discs.

The center member consists of a centering ring carrying a non-metallic, sound deadening, oilless, replaceable bushing supported by three radical arms which securely lock it in a concentric position on the flange spider bolts. The centering shaft is pressed into the tubular spider and has a spherical surface, providing for both angular and longitudinal movements.

The cupped washers that grip the fabric have no sharp cutting edges and no irregular surfaces to cut into the outer layers of the fabric and set up disintegration. It is claimed that the concave-convex form of the washer not only makes it possible to secure the same gripping area with a small washer diameter, thereby reducing internal friction by increasing the distance for flexing between the washers, but also permits the driving by abutment without resorting to special discs, which are undesirable from the service standpoint.

The flange spider hubs are all turned to S. A. E. standard dimensions to remove excess weight. The torsional strain is removed from the tube weld by a patented process of swaging the tube back of the weld into the slots or key ways milled into the tubular spider hubs.

The entire design, which has been perfected after 18 months of research, development and testing, is based upon the long experience of the Arvac Manufacturing Co. in the manufacture and application of metallic universal joints and upon a very thorough and exhaustive commercial survey which included all passenger car and truck builders.

Hartford Shows New Universal Joint

THE Hartford Automotive Parts Co., Hartford, Conn., an organization which has been manufacturing universal joints for 15 years, announce that they have developed a new type of oil-lubricated joint which uses oil instead of grease for lubricating the wearing parts. This joint is intended primarily to meet the need for a unit of this character.

BOTH simplicity and strength are incorporated in the design of the new joint, while all parts are concentric in character and can be accurately made, the manufacturer claims, at a moderate cost. Several features incorporated in the new joint which might be mentioned, is that natural forces are utilized to insure positive lubrication of bearing surfaces. The joint can be refilled con-

veniently by the removal of any one of the four oil plugs located in the ends of the bushing retainers. The construction positively prevents dust or other foreign matter from reaching any of the working surfaces. Maximum life is assured the joint by supplying positive lubrication and the elimination of dirt or dust from the working surfaces. The lubricant is applied where needed even when the volume is reduced to the minimum and the driving torque stresses are distributed at equal distances from the center of all bearings, which are of equal size.

The construction is the tubular cross pin type with an internal oil reservoir extending the full length of both pins, affording capacity for a liberal supply of oil. Centrifugal force throws the oil to the end of the bushing retaining sleeves from where it is fed by capillary attraction to the bearing surfaces of the bushings and pins.

A packing of rectangular section completely encircles the working surfaces at the inner face of the bushings and excludes all foreign matter and dirt. These packings are held in position by clamp bands and are readily removed without disassembling the joint. Hardened thrust collars with large bearing areas reduce the side wear between center blocks and yokes to a minimum.

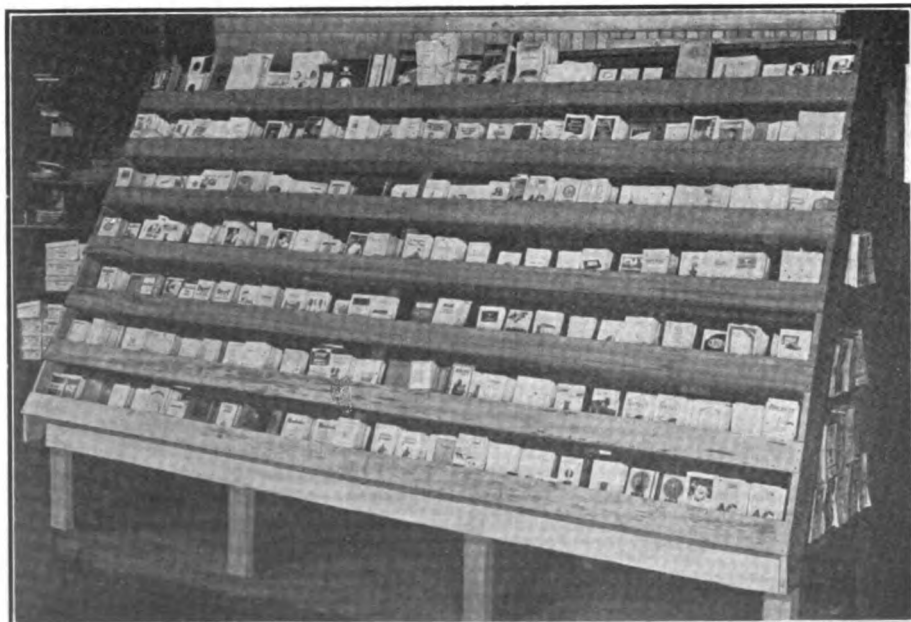
Refilling of the joint is accomplished by the removal of a single plug at the top of any of the four bushing retainers. Bearing pressures are distributed over large areas, giving very low unit pressure, which is desirable; and bearings will run cool under maximum load it is claimed.

The cross pins are a pressed fit in the center block and cannot work loose as the small pin keeps the large pin from moving and a locking screw passing through the center block fastens the small pin securely in position. Bushings are forced into the retainers, which are screwed in position and are securely located by staking. A separate chamber is provided for oiling the spline shaft, independent of the joint proper, allowing this member to work continually in a bath of oil.

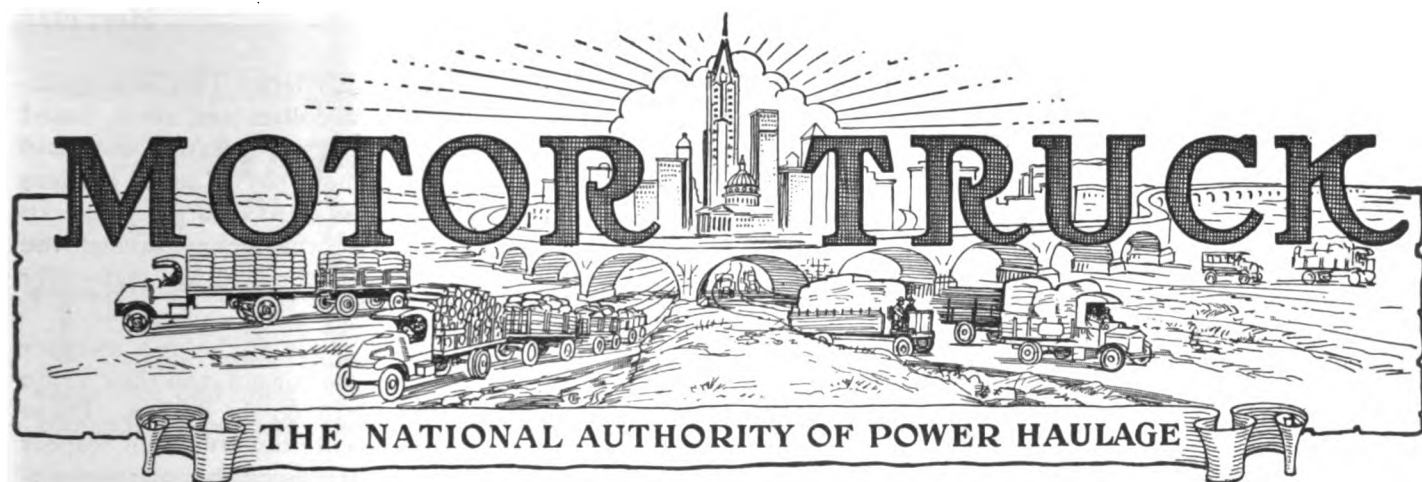
FLORIDA RAILROAD PAYS GOOD DIVIDENDS.

CAPOS BEACH, FLA., April 14.—This village boasts absolutely the shortest one-horse power railroad in the world. From terminus to terminus the distance is just a quarter of a mile. The line has never been reported in financial difficulties and the management effects a great saving because it never has to use snow plows. The mileage of the "engine" used figures about four miles to the gallon of oats, an observer states.

Colorado, with a population of 1,000,000 had half that many rail and auto tourists in 1921 who remained from one to three weeks and spent \$35,000,000.



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PAWTUCKET, R. I.

MAY, 1922.

Motor Trucks Superseding Horses in Post Office Department

Commercial Vehicles Used on Various Routes Average
10 Miles Daily and Make Possible Large Economies by
Giving Maximum of Service at Minimum of Expendence.

THE successful haulage business of the present day is one that makes a reasonable profit after giving its patrons the maximum of service at the minimum of cost. These conditions are possible only where the means employed are both efficient and economical. There can be neither efficiency nor economy where there is lost motion, and lost motion exists where the vehicle is consuming when it is not producing. The facility must also be dependable and this reduces the

field of selection to vehicles that can be operated during adverse weather conditions of any and all kinds.

The postal establishment, employing a personnel numbering approximately 326,000 employees, is undoubtedly the largest business establishment in the world. It is a public enterprise operated without a view to profit, giving the maximum of service at the minimum of cost; it is imperative therefore that only efficient and economical methods be used in moving mails.

PRIOR to October 1, 1914, the number of motor trucks used in mail transportation was almost negligible. But since that date the Government has been installing its own equipment; at the present time the Post Office Department is operating 4,000 trucks and 700 motorcycles, distributed among 286 of the largest cities and towns.

As the result of more than seven years' experience in the use of motor vehicles, it has been demonstrated clearly that they have many advantages over horse-drawn equipment, even where the distance to be travelled is short, although a larger saving naturally results where long hauls are involved.

The requirements of the transportation service of the postal estab-



In Just One City Where the Letter Box Collections and Parcel Post Deliveries Were Only Partly Motorized, 95 Trucks; Similar to the One Shown in the Picture; Combined with 17 Carriers on Foot to Do Away with 240 Horse-Drawn Vehicles; the Saving to the Department Being Roughly Reckoned at \$33,000 a Year. In Addition to Money Saved Collection of All Classes of Mail Was Materially Advanced.

lishment are quite different from those of any other line of business, as the flow of the mail fluctuates with the seasons and there are peak periods each day, while on certain days of the week the volume is much greater than on other days. Furthermore, all service is performed on schedules based on the arrival and departure of trains, steamships, et cetera, or on the beginning and ending of letter carrier delivery; it is, therefore, necessary to maintain at all times sufficient equipment to meet the needs of the peak periods, and at the same time take care of the general run of business from the various departments.

Speed is a salient factor in the transportation of mail, as the public demands that its mail be handled promptly. The importance of ex-

FORMER POSTMASTER GENERAL HAYS PREDICTS UNIVERSAL RECOGNITION OF MOTOR VEHICLE.

"A LITTLE while ago I read an article by H. G. Wells that I wish might be read by every business man; in fact it could be read with advantage in every school house in America. Wells traced the development of civilization to two factors, transportation and communication. These have been the vital factors that have enabled human beings to develop so marvelously and so rapidly in the last few hundred years.

"The Postoffice Department is the government department of communications. We are all glad and proud to be associated with one of the vital factors in civilization. But we also touch upon transportation, and I look forward to a time not far distant when motor vehicle transportation will be universally recognized as one of the vital factors in the development of civilization."

pedition as applied to the mail service will be readily appreciated when it is known that during the current calendar year more than 12,000,000 letters will require transportation service—1,400,000 letters every hour. The bulk of the day's letter mail, approximately 60 per cent., is posted by the public between the hour of 5 and 8 o'clock P. M., when the hourly rate of handing approximates 6,666,666, or 111,111 letters a minute. Accordingly, should it be necessary to transport all letter mail to a railroad station, steamship dock or any point where other than vehicular transportation is required, and the distance involved is from a half to one mile, there would be a delay in delivery of 333,333 letters should the transportation be effected by horse-drawn vehicles in lieu of motor trucks.

Trucks Cover 100 Miles Daily.

The maximum service that may reasonably be expected of a horse under the conditions prevailing in the mail service, where travel is over paved streets and usually through congested districts, is about 8 hours per day, 5 days per week, with a maximum of daily travel not exceeding 24 miles. The saving that will result from the use of motor trucks in comparison with horse-drawn vehicles is conspicuously apparent when it is stated that many of the trucks used by the mail service cover in excess of 100 miles per day, working on two

tours aggregating from 12 to 16 hours per day. These trucks are used in making collections from letter boxes and are operated by letter carriers, whose compensation beginning with the fifth year service is at the rate of \$1,800 per year. It would require four horse-drawn wagons and four letter carriers, working 32 hours per day in the aggregate to perform the same service that is rendered by two $\frac{3}{8}$ -ton trucks and two carriers working from twelve to sixteen hours per day.

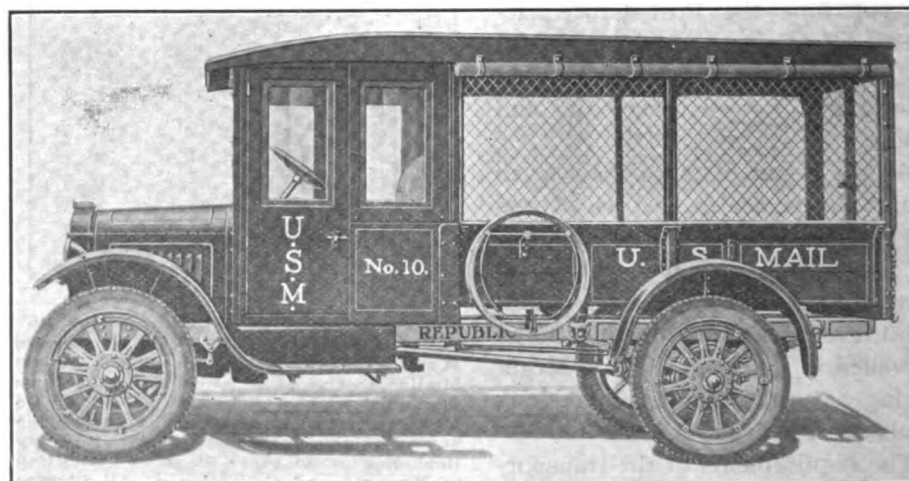
Truck Installation in One City Netted \$30,000.

In one city where a portion of the letter box collections and parcel post delivery service was motorized, 95 $\frac{3}{8}$ -ton trucks operated by 152 letter carriers and 17 carriers on foot, superseded 240 horse-drawn wagons driven by an equal number

of letter carriers. This saving expressed in dollars and cents, based on present day operating cost and the maximum pay of letter carriers is in excess of \$33,000 per year. In addition to the money saving, the collection of the mail was materially advanced.

Horses have to be fed whether they are used or not, and their value in constantly on the decline. These conditions are not true with respect to motor trucks, as they are not consuming when not in operation, and the depreciation when idle is negligible. The importance of this citation is obvious when it is known that in the mail service only a small percentage of the regular week day transportation is required on Sundays and holidays and these days amount to more than 16 per cent, of the days in a year.

A very forceful illustration of the dependability of motor trucks, as compared with horse-drawn vehicles, resulted from extremely adverse weather conditions in one of the very large cities during the month of February, 1919. The Department had a contract with a trucking corporation for furnishing 70 horse-drawn wagons, for use in delivering parcel post matter in the badly congested sections of the city, and during $3\frac{1}{2}$ days, when the storm was at its height, the contractor was unable to furnish a single horse-drawn vehicle. Whereas, the motor trucks, owned and operated by the postal service, continued to function in a creditable manner, although it must be admitted that schedules were not adhered to strictly.

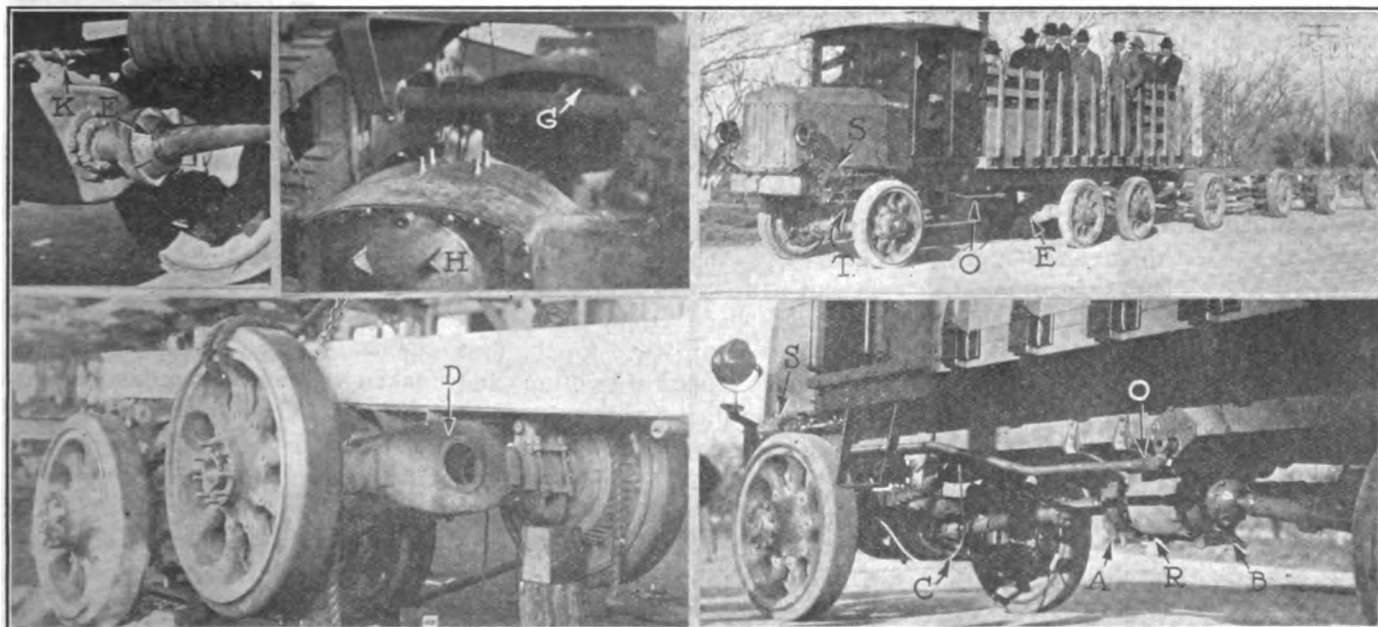


Type of Truck Much Used in Various Departments of Postoffice Service.

METHOD OF CONNECTING UP THE SIX-WHEEL DRIVE TRUCK

THE accompanying photos show the method of connecting up the six wheels of the six wheel drive motor truck. The arrows at A B C E show four ball universal joints on the drive shaft that transmit the power to the six drive wheels, and, at the

same time, permit the four steering wheels to be steered. The truck steers on the two front and two rear wheels. The two midway wheels do not steer the truck as one might at first suppose, but remain rigid with the chassis of the vehicle.



By Studying the Text and Referring to the Illustration This Seemingly Intricate Drive Method Will Be Readily Understood.

THE ball universal joint consists of a driving fork, double slotted ball and driven fork. The two forks are designed so as to accommodate the gear in one case and the driving member of the wheel in the other. The slotted ball acts as transmitter of power between the two fork members.

In photo No. 5, A and C show the two ball universal joints on the drive shaft leading from the transmission (shown at R) to the front wheels, which permits the two front wheels to move in any direction.

In photos Nos. 2 and 5, B and E show the two ball universal joints on the drive shaft leading from the transmission to the rear wheels. In photo No. 2, K shows the steering rod with two universal joints for steering the rear wheels. This rod is controlled by rod O, photo No. 5. Steering is accomplished by oil pressure, the cylinder being shown at S S, in photos Nos. 5 and 6. Steering can also be manouvered by manual power at the steering wheel.

This truck has a capacity for carrying 10-tons. It tows two 5-ton trailers giving the train a total capacity of 20-tons.

All four steering wheels of the truck intersteer so that when the front wheels are turned in one direction, the two rear steering wheels are turned in the opposite direction so that the truck is practically on a pivot, giving an unusually short turning radius.

Also, all four wheels of the two trailers intersteer, consequently, one driver can drive the train around a sharp corner without looking around to see if the trailers are striking anything, because the wheels of both trailers can be made to follow in the track made by the truck.

Each wheel of the motor truck and the trailers have their own brake, which is a combination of pneumatic and hydraulic device. This brake is so arranged that, should one or more of the trailers get loose, the brakes are automatically applied. There is also a

device that automatically puts the proper amount of brake on the trailers when they are crowding the power unit in going down grade.

Various devices are installed on the trailers which absolutely eliminate any wobble in the trailers, thereby eliminating the menace to other traffic, which is often encountered in case of some of the trailers now in use.

The fact that one man can drive the train of automobiles without assistance and more economically than three drivers for three trucks reduces the gas consumption and overhead.

The six wheel drive feature of the truck eliminates entirely the slippage and gives a traction of 100 per cent.

By putting the 10-ton load over the four wheels in the rear of the truck instead of over two, as in the four wheel trucks, it doubles the bearing surface of the train and only brings half the pressure on any one point of the highway.

Arrest 150 for Violating Load Law

MOTOR TRUCK for April contained a summary of motor truck legislation recently passed by the State of New York. The next chapter opens with the arrest of and imposition of a \$25 fine upon 150 motor truck drivers in the vicinity of Pelham Manor for carrying excessive loads a few days ago—the sharpest reminder which motor truck interests in New York have yet experienced that the authorities have decided the practise of truck overloading must stop. The recent drastic action was taken under the authority of the Highway Commission, and it marked

the first step to carry out in a thorough manner the provisions of the bill—passed by the late Legislature, and which went into effect on April 7, when it received the Governor's signature.

The speed with which the new act was put into effect took many motor truck owners unawares. Its provisions are only applicable outside of large cities. The members of the Motor Truck Association of America have been notified of the penalties awaiting them in case of overloading, with this warning sent out by the general manager, Theodore D. Pratt:

“**T**HE law has teeth in it. Do not overload,” and he also adds, “the state authorities are determined to stop the overloading of trucks.”

The overloading evil as a menace to highways, with the development of motor transportation, has been increasing. New Jersey, Connecticut and Massachusetts have laws against it, and in those states the law is observed consistently. New York formerly had a makeshift regulatory act, but it had no “teeth” in it.

Under the existing law every motor truck and trailer must have clearly designated, on a metal plate or in painting, on the right side of the body or chassis, or on the right side of the cab below the driver's seat, the capacity weight of the vehicle and the gross carrying weight when loaded. Failure to carry such a sign will incur a maximum fine of \$25.

Failure to observe proper loading constitutes a misdemeanor. For the first offense a fine up to \$50 may be imposed or a 30-day sentence. For the second offense the minimum fine is \$50, with a maximum of \$100, or a 60-day sentence. A third offense will be fatal, for in addition to the penalty of a mandatory fine of \$100, which may be increased to \$250, and the possibility of a three months' jail sentence, it is provided that “the registration of the motor truck shall be suspended for a period of not less than 30 days and not more than six months.”

These penalties would indicate that Mr. Pratt has sized the law up correctly when he says it has

“teeth” in it.

The law also has the power to correct the overloading on the spot. In a spirit of fairness a five per cent. overload will be allowed.

Specific speed regulations for trucks are also provided for the first time. Motor trucks of two tons and under are permitted a 20-mile speed per hour; those exceeding two tons are restricted to 15 miles. These speeds apply to vehicles equipped with solid tires. For pneumatic tires five miles additional is allowed.

The bill also increases the maximum weight which may be carried, permitting 28,000 pounds. The limit formerly was 25,000 pounds. The New York maximum is now the same as in Massachusetts. New Jersey does better in permitting loads of 30,000 pounds to be carried, while Connecticut allows only 25,000 pounds. Incidentally, it may be noted that overloading is regarded very seriously in the Nutmeg state, where several fines of \$200 have been imposed for the first offense. A \$500 penalty, however, is permissible. After a third offense in New Jersey the motor truck license may be suspended. It is not mandatory as is now the case in New York, and this state has the distinction of having the most severe motor truck law in the country in respect to overloading.

Still another phase of the New York act which vitally effects many of the larger trucks is that the maximum load on any one wheel per inch of tire width is reduced from 800 to 700 pounds. Of the 160,000 motor commercial vehicles registered in the state about 7500 are of

five to 7½-ton capacity. The new provision will make it necessary for many of the larger trucks to use tires about an inch wider than their customary equipment.

Practically all the motor truck organizations in the country have taken a firm stand against the growing practise of overloading. Consistently done, it impairs the utility of the truck, to say nothing of damage to the highways. As motor transportation increases throughout the country there will doubtless be severe overloading penalties until the evil is eliminated. The state acts taken to curb the practise are highway measures entirely. A feature that will probably insure the enforcement of the new law more generally is that all fines collected for overloading, while going to the Highway Department, will ultimately be used for road work in the towns where the arrests were made.

“The Motor Truck Association of America,” said Mr. Pratt, “believes that with proper regulation of loads and speeds the state could now, and for years to come, maintain the highways properly with the income from motor vehicles with the license fees as now exist. Our position has been that before any more money was raised from motor vehicle operators for road purposes the state should take the fundamental steps to preserve what it now has, instead of letting a very small percentage of the users of automobile and motor trucks destroy the roads and then tax the other 98 to 99 per cent. a higher tax to rebuild, all of which savors of good sound logic.”

HIGH TAXES HAMPER EXPORT

HIGH and discriminatory taxes on motor vehicles are proving to be injurious to motor transportation of certain foreign countries. In Japan this is strikingly illustrated. The authorities of Tokio, apparently seeking revenue, raised the motor tax by 50 to 80 per cent. The operating costs became excessive and many cars were retired from service.

AT THE TIME there were 5,000 cars in use. Upon promulgation of the law, 600 licenses were returned and a like number placed in storage. Thus, a major problem of Japan, that of congestion in cities, was made more difficult of solution, because of the decrease in modern transportation.

The central Japanese government, realizing this error, recently sent an official to the United States to study our traffic arrangements. His conclusion was that Japan can solve its problem of congested cities best by encouraging motor

vehicle transportation. The removal of discriminatorily high taxes is the first step and action in that direction may soon be officially recommended to the prefectures throughout Japan.

In France, the demoralization of the automobile industry is directly traceable

to high taxes. Although French manufacturers have an unusual advantage in their home market because of an import duty of 45 per cent, they are still unable to keep their factories reasonably busy. The numerous and high taxes make operation of any type of motor vehicle exceedingly expensive and many persons, whose occupation might make use of an automobile, have to forego its timesaving advantages and perform their work in a less efficient manner.

The automobile situation in England is similar to that of France. Motor vehicles, despite their utility value which was especially emphasized during the strikes, are taxed. The inequality of this assessment is being demonstrated by experiences of automobile owners who are urging a modification or a repeal.

A contrast from that of these countries is afforded in the taxation policy of Canada, where the taxes derived by the provinces are devoted to the maintenance of roads, and where the central government imposes no discriminatory taxes. Canada's motor vehicle registration, 463,000, is nearly as large as the mother country which has 497,000, although the dominion is much smaller.

WOMEN IN BUSINESS.

THE AUTOMOBILE business is finding women increasingly good prospects as individual car buyers. They not only are the purchasing agents of the home, but are, also, capturing many fields of business through peaceful penetration. There are 261,500 women farmers in the United States and 144,000 women who pay personal income taxes in New York.

RECENT REVISIONS OF TRUCK PRICES

	Tons	Old	New	Difference		Tons	Old	New	Difference
Acason	1½	\$2485	\$1950	\$535	Menominee HT	1¼	2080	2000	80
Acason	2½	3295	2750	545	Menominee H	1½	2725	2475	250
Acason	3½	4295	3450	845	Menominee D	2	3245	2875	370
Acason	5	5250	4350	900	Menominee G	3½	4270	3800	470
Autocar	F	2300	1950	350	Menominee J 3	5	5450	4850	600
Autocar	G	2400	2050	350	Master J W	1½	2690	2290	400
Autocar	Y	4350	3950	400	Master W	2½	3290	2890	400
Autocar	B	4500	4100	400	Master D	2½	3540	3190	350
Bethlehem	1	1595	995	600	Master A	3½	4190	3990	200
Bethlehem	2	2725	1495	1230	Master E	3½	4640	4290	350
Bethlehem	3	3750	1895	1855	Master B	5	5290	4990	300
Bethlehem	3½	4195	1995	2200	Master F	5	5440	5090	350
Commerce	1½	2050	1695	355	Packard E C	2	3500	3100	400
Corbitt	1	2200	1480	720	Packard E X	2	4000	3500	500
Corbitt	1½	2600	2200	400	Selden Unit 30	1½	2360	2250	110
Corbitt	2	3150	2600	550	Selden Unit 50	2½	3425	3250	175
Corbitt	2½	3300	3000	300	Selden Unit 70	3½	4175	3750	425
Corbitt	3½	4100	3800	300	Selden Unit 90	5	5600	4950	650
Corbitt	5	5000	4500	500	Signal	1	2475	1950	525
Denby	¾	1625	1485	140	Signal	1½	2925	2450	475
Denby	1½	2300	2145	155	Signal	2½	3275	2875	400
Denby	2	2600	2395	205	Signal	3½	4275	3675	600
Denby	4	4200	3895	305	Signal	5	5300	4400	900
Denby	5	4850	4295	555	Stewart	¾	1395	1195	200
Denby	7	5550	4945	605	Stewart	1	1875	1395	480
Duplex	3½	4250	3500	750	Stewart	1½	2200	1790	410
Ford T. T.	1	445	430	15	Stewart	2	2800	2090	710
Garford 25 B L	1¼	2090	2040	50	Stewart	2½	2950	2290	660
Garford H L	2	3190	2750	440	Stewart	3½	3850	3090	760
Garford 77 D L	3½	4490	3850	640	Stoughton F	1	1995	1790	205
Garford 68 D L	5	5300	4600	700	Stoughton B	1½	2350	2150	200
Garford 150 A L	7½	5600	5300	300	Stoughton D	2	2800	2490	310
Gary F	1	2100	2600	*500	Stoughton E	3	3600	3150	450
Gary I	1½	2550	2900	*350	Transport 15	1	1395	1295	100
Gary J	2½	3150	3800	*650	Transport 25	1½	1995	1495	500
Gary K	3½	4050	4900	*850	Transport 35	2	...	1185	...
Gary M	5	5150	5900	*750	Transport 55	3	...	2385	...
G. M. C. K-41	2	3000	2775	225	Transport 60	3½	3885	2585	1300
G. M. C. K-71	3½	4250	3950	300	Transport 75	5	...	5485	...
G. M. C. K-101	5	4650	4350	300	Veteran	1½	3500	2699	801
Gramm Pioneer 15	1½	2050	1900	150	Veteran	2	4000	3699	301
Gramm Pioneer 65	1½	2725	2500	225	Veteran	3	4400	4200	200
Gramm Pioneer 20	2	3175	2925	250	Veteran	4	5600	5395	205
Gramm Pioneer 75	3½	4375	4225	150	Ward-La France 2B	2½	3590	2990	600
Gramm Pioneer 50	5	5275	4895	380	Ward-La France 4A	3½	4690	3990	700
Harvey W. O. A. . . . .	...	2950	2650	300	Ward-La France 5A	5	5590	4590	1000
Harvey W. F. A. . . . .	...	3200	2950	250	Wichita K	1	2000	1875	125
Kearns-Dughie H.	1	1600	1150	450	Wichita M	2	2500	2400	100
Kearns-Dughie M.	2	2200	1650	550	Wichita R X	3	3500	3200	300
					Wichita O	4	3900	3500	400

PERTINENT POINTED

NEW YORK MEANS BUSINESS.

PELHAM MANOR is jubilant. On every corner groups of citizenry gather to discuss with bated breath the strange caravan of dusty vehicles, piled high with boxes and bales of valuables, from Orient and Occident that paused long enough as it rumbled through the little town to present the highway maintenance department with a tribute aggregating \$3750. They tell also of the drivers of these vehicles—great husky, tanned fellows, every one as rugged as the truck he drove—how they swore strange oaths and grew red faced as each of the 150 handed up his individual \$25; a strange way to make an offering, they say—yet not so strange when one is playing tag-day with a judge.

And the occasion merits fully the awe with which the natives discuss this modern manna, for it isn't often that a little cross-roads village rakes in any such relatively large amount of lucre between suns.

"The best part of it," says Citizen Jones' wife to Citizen Smith's wife as, aprons over head to keep out the biting wind of early May they lean across the backyard fence—"the best part of it is that the harvest is just begun as it is expected that the \$25 toll will be paid by many another vehicle owner"—and it will, unless the various drivers who use that route acquaint themselves with the law against overloading. The harvest is to be a short one in all probability, but for the time being it furnishes a greater source of revenue than the moss-grown toll gate that used to stand in the vicinity in the days of old.

* * * * *

The New York legislature meant business when it passed the drastic measure against overloading on state highways. The ink had hardly dried on the governor's signature that made the enactment a law when the highway department got into action with the results noted in the foregoing paragraphs.

New York has had a law against overloading for at least two years. But the authorities have been somewhat amiable about enforcing it, and anyway this law never was particularly severe.

The new law, however, with the various penalties involved, gives New York the distinc-

tion of having the most severely restrictive truck legislation of any state, as the penalty for a third offense (See MOTOR TRUCK, April, Page 209) may cost the operator his license, a fine of \$250 and three months in jail—all for overloading a motor truck.

At first glance such drastic action is sharply reminiscent of the laws of an earlier generation, but—as every fair minded man will admit, there are two mighty good reasons why overloading should be discontinued. First—because it is the greatest factor in shortening the life of the truck that is known. Running without proper lubrication might seem to be the worst thing that the driver could do, but burned out bearings, connecting rods or pistons that might suffer from this evil can be easily taken care of—whereas if the truck is overloaded enough times, it is entirely worn out and must be replaced by another new truck.

The second reason why overloading should be discontinued is obvious—it simply ruins the highways. The fact is too well known to need elaboration, but just in passing it may be remarked that a heavily overloaded two-ton truck does more damage to the road it is driven over than does a five-ton truck carrying the load for which it is rated, even though this latter load may weigh a lot more than the overload carried by the lighter truck. Perhaps it doesn't sound logical, but it's been proven to be true time and again.

Motor transportation of goods has come to stay; indeed, there are many who believe that this method of freight haulage is still in its infancy. Under existing road conditions there is bound to be a lot of "restrictive" legislation. Highways finally will be made strong enough to carry almost any load, however, and when that time comes, drastic legislation automatically will cease. And that time isn't so far off as one might think. Already Connecticut, as noted in the following article, has made plans for a 30-mile highway to be used by commercial vehicles to the exclusion of all other traffic. This is but the beginning.

Future generations of truck drivers, guiding their mammoth carriers over specially built high-

COMMENT OF THE DAY

ways will glance aloft at the speeding aero-freight carriers and never know that there was such a thing as restrictive legislation. But that's another day. Right now it would appear that the politic truck operator might do worse than to observe the laws, drastic and restrictive though they seem to be, since by so doing he is furthering a worthy cause—and one that will be far reaching in its eventual effect.

PROGRESS.

AND, as though to prove again the truth of that proverbial utterance "The last shall be first" along comes Connecticut long known for its unfavorable attitude toward the motor vehicle with the calm announcement that plans have been perfected for a 30-mile highway to be used exclusively by motor trucks.

This road, work on which is soon to start, will run between Bridgeport and Greenwich, closely adjacent to the Boston Post Road, one of the most traveled routes in this country. It is estimated by a traffic authority that there are more than 3500 heavily loaded motor trucks that daily make use of the post road in addition to the 10,000 automobiles that daily pass over this highway—all of which constitutes a problem that in the minds of the authorities can only be solved by the building of another road.

Practically all of the trucks are of large size, are carrying capacity loads and because of their large numbers are said to have made it imperative to relieve the post route of at least a part of the traffic since the condition of that highway is becoming such that ordinary methods of maintenance are entirely inadequate to keep it in proper shape. Of course these facts alone may account for the decision to build the new road—although one would prefer to think of the action as significant of progress rather than the one and only solution of a mighty tough problem.

The route of the new highway parallels the post road at an approximate distance of two miles, except at Bridgeport, where it passes through the outskirts of the city to avoid traffic. At Fairfield and Stamford the new road, which will serve the towns and cities served by the post road, crosses the latter highway, running to the north side of the present road from Stamford to

the New York boundary line at Greenwich, where it joins the New York state highway.

The cost of the proposed route will not be known until such time as all plans have been approved, but as it will make use for a great part of the distance of existing country roads and city streets the expense will not be prohibitively large.

SERVICE.

BIG department stores, making business by furnishing "free" delivery of articles purchased, know definitely that they could never go back to the horse drawn vehicle and hope to handle their trade in an efficient manner. Experience, the great teacher, has shown the owners of these establishments the economy of the motor truck. Of greater importance, it has shown them the way to speed up deliveries, serving a greater number of customers than ever was possible by the use of horses. Economy figures strongly in the final reckoning, but speed coupled with reliability counts most in the minds of many business men.

Imagine the largest office building in the world suddenly shutting off all elevator service and you get a fairly analagous picture of the chaos that would result if the department stores suddenly decided to go back to using horses.

WASTE.

ONE-HALF of all the vegetables grown never reach the table, but are allowed to go to waste. Certain farmers will tell you that this figure is too low by 10 per cent. What's the reason for this gross waste of foodstuffs? Is it due to inefficiency on the part of certain interests? Or can it directly be traced to lack of transportation facilities? Probably not the latter. Why? Because though milk is a whole lot more perishable than vegetables, less than four per cent. of the milk produced is wasted.

Why wouldn't it be a good idea to see if it isn't possible to get the farmers of your territory interested in the ownership of motor trucks as a first step toward righting conditions. 'Twould help.

LEGAL POINTS

By SAMUEL WANT

SOMETHING of the historical development of vehicular traffic frequently crops out in connection with the many legal problems arising out of the use of automobiles. Note, for example, this interesting situation as disclosed by a recent decision of the Supreme Court of New Hampshire.

In the state named a toll bridge company was incorporated in the year 1795. Its charter expressly provides the scale of charges for traffic passing over the bridge and under the law it is limited strictly to such charges. The schedule thus provided sets out the various forms of traffic then in vogue, including pack horses, hand barrows, or ox teams, two-wheel passenger carriages and "carriages for burthen," but the wily legislator who drew the charter lacked the prescience to foresee the new forms of conveyance that future generations were to develop.

An ingenious tourist who was aware of this gap in the scale of charges refused to pay the tolls required of automobilists for passage over the bridge, insisting that the imposition of such charges was an enlargement of the charter scale made without the legal authority which is necessary to effect a change in a corporate charter.

But the law is elastic; that is the judicial way of expressing the popular idea of stretching the law. The court held that as to passenger automobiles the provision of the charter covering "four-wheel carriages for passengers" is applicable, although admittedly this provision was expressly intended to cover horse drawn vehicles. As to automobile trucks, the court decided that they must be held to be subject to the charges provided for "carriages for burthen drawn by two or four beasts."

Query—Will the charter stand another pull to cover the case of aeroplane traffic?

SOME solace for public officials who, barred from the helpful tactics of the labor unions, find themselves losing out in the fight with Mr. H. C. L. is found in a recent New York case. In New York, as in almost all other states, there is a constitutional inhibition against granting extra compensation to public officials during the term for which they were elected or appointed. In one of the counties the superintendent of roads was provided with an automobile at public cost for the purpose of facilitating the performance of his duties. Payment for the car was refused by some officials concerned with the approval of expenditures on the ground that the

transaction was tantamount to the granting of extra compensation to the road officer. But the court decided otherwise and directed that payment be made.

THE evidence in a recent Florida case showed that the last note due under an installment contract for the sale of an automobile was not paid on the due date. On the following day the account was placed in the hands of an attorney with instructions to reclaim the car. The contract provided for the payment of an attorney's fee if the note was not paid at maturity and was placed in the hands of an attorney. On the same day that the attorney received the claim the seller received the debtor's check in payment of the note. It was not certified. The seller refused to accept the check, demanding that the attorney's fee be paid also. This the purchaser refused to pay, but he offered no explanation for his delay of one day in making the remittance. While the default was thus one of purely nominal duration, the court held that the contract requirement was enforceable, so that the debtor either had to pay the attorney's fee or surrender the car.

AMONG the very recent decisions is one of especial interest to dealers who sell cars and truck attachments on the partial or time payment plan. A Ford was purchased on the partial payment plan, a mortgage or its equivalent being given for the unpaid balance at the time of purchase. While the mortgage remained unpaid the owner purchased one of the well known truck attachments and by means of it converted his passenger machine into a truck. The attachment was likewise purchased on the partial payment plan, and a mortgage was given on the car as reformed, covering the unpaid balance due on the attachment. The payments on the attachment were not kept up, and when the seller attempted to enforce his mortgage he was met by the claim of the holder of the first mortgage, who maintained that his mortgage covered the car not only in its original condition, but also in any changed or improved condition in which it might be put while the mortgage remained in force. The court decided, however, that the seller of the truck attachment could detach and reclaim it, though as a general rule a mortgage on personal property includes improvements placed upon it in the course of its use for its usual purposes.

EVERY now and then some minor judicial officer, concerned more or less with the enforcement of automobile regulations, feels an impulse to warn the public of the incorrigible ruthlessness of all automobile owners, and

the consequent necessity of penalizing them heavily for all automobile accidents involving violations of law. In several states these worthy officials have secured considerable support for a measure that will penalize the owner of a car which has been involved in an accident, if a violation of law is established against the driver, regardless of the presence of the owner in the car at the time, or of his knowledge of the accident or consent to any act contributing to it. Mark you, we are speaking of criminal penalties, not compensation to injured persons.

Entirely aside from constitutional objections the injustice of such a measure is patent. Recklessness and lawless tendencies cannot be cured by vicarious punishment, and there is hardly room for the argument that chauffeurs will be made more careful by reason of the criminal responsibility of their employers for the acts of the former.

To the extent that it is desired to prevent owners from escaping responsibility for the acts of their chauffeurs which they connived at, encouraged or passively permitted, there is, perhaps, ample room for broadening the scope of the present law.

Prior to 1917 the Canadian law was almost as broad as the one now in question. In the year named the law was amended so that the owner's criminal liability was remitted upon proper proof that he was not driving at the time the violation of law occurred, and that the one who was driving his car at the time was doing so without his consent. This still leaves the owner responsible for violations of law committed in his absence when the car is being used with his authority or knowledge, but as to such cases it is expressly provided that the owner shall not be liable to imprisonment.

UNDER the bankruptcy law an unrecorded mortgage is not recognized, and property covered by such a security will become a part of the general assets for distribution equally among all creditors of the bankrupt. On the other hand a pledge which involves delivery of personal property by a debtor to a creditor as security is recognized by the bankrupt law.

These rules were applied recently in a federal decision in which it appeared that a bank loaned money on certain automobile trucks which were delivered to it as security. The bank also took a mortgage on the trucks, but the mortgage was not recorded. The debtor became a bankrupt, and his creditors claimed that the trucks were a part of the assets for general distribution, while the bank claimed the trucks as exclusive security for its loan. Under the rule above stated the bank's claim was sustained.

AN ILLUSTRATION of the rule that the negligence of people in the highways will not excuse a motorist who fails to exercise due care to avoid the consequences of such negligence is furnished in a recent decision of the Supreme Court of Connecticut. The facts of this case show that a party of motorists were engaged in replacing a tire on their car and that at the particular place the road was so narrow that a street car would necessarily strike them in passing, unless they got out of the way. It was a very dark night and a street car did come along and strike the party, causing injuries to all of them. The testimony showed that the trolley car carried a light which was effective, for only 15 feet ahead, while the car moved at a speed which required a space of 100 feet within which to stop. The court held that, notwithstanding the negligence of the claimants, the accident could and should have been avoided by the use of lights on the trolley car adequate to the conditions under which it traveled, and that therefore the car company was liable for the injuries.

IN A VERY recent case the Supreme Court of Massachusetts was called upon to decide whether a corporation whose stock was owned and controlled by one man had a legal existence apart from that of the man. The suit disclosed that a claim had been prosecuted without success against the corporation for injuries sustained in an accident in which an automobile truck owned by the corporation figured. At the time of the accident the truck was being driven by the man who owned the corporation. The present suit was brought against said man, who maintained that he and the corporation were one, and that therefore the verdict in favor of the corporation in the prior suit settled the issue in his favor, too. In the opinion of the court, however, that is not the law and the claim was sustained.

IN A VERY recent decision rendered in Pennsylvania it was held that the negligence of the driver of an automobile in crossing railroad tracks without first looking and listening for oncoming trains is imputable to a passenger in the car as a matter of law, so that, even assuming the negligence of the railroad company in a given case, a claim or the death of a passenger in an automobile under the circumstances stated is not even entitled to go before the jury for their consideration. This is contrary to the decisions in almost all other states.

Of course where a passenger in an automobile controls the actions of the driver, the latter's negligence is a bar to a suit by the former if an accident occurs. For example, as shown in a recent New York case, where a fire chief is driven in an official car by a fireman, the former directing the latter during the trip, both are prevented from maintaining suits against another motorist with whom they collided, where the accident was due to the joint negligence of the drivers of both cars.

IN A RECENT Georgia case a reckless motorist learned that the refinements of the law play havoc with the popular conception of the cost of subordinating the safety of pedestrians to the transient pleasures of speeding and of other species of violations of the rules of common sense and law relating to the operation of motor vehicles. The pedestrian injured in this case was a married man. His injuries did not appear to be serious and he claimed only \$500 as damages. While his suit was still pending in court he died. His wife was appointed to administer upon his estate and she prosecuted the damage suit to a conclusion for the benefit of the estate. A verdict for \$500 was obtained and the amount was paid to the wife as administratrix.

Subsequently the wife brought suit against the motorist on her own account. She claimed that her husband had died as a result of the automobile accident, and she demanded damages for her consequent loss of the support and companionship of her spouse. The motorist's defense was that only one suit at law can be brought for the same cause, and he insisted that the damages paid by him in the first suit discharged his liability for the accident. As the court pointed out, however, liability for an accident extends to all natural consequences of it. The first suit was solely for the benefit of the estate. A verdict upon his death his claim was an asset of his estate. His widow's claim for her loss did not accrue until his death. Hence it could not be barred by the settlement in the first suit.

The forfeiture provisions of the state laws relating to the unlawful transportation of liquor by automobile continue to be featured in the decisions of many states. In Alabama this class of litigation has taken the lead over such former favorites as divorce cases, murder trials and the like, and in other southern states it has attained equal prominence, though competing with perhaps a less vicious line of outstanding litigation. One of the very latest decisions comes from the Supreme Court of Georgia. In this case an automobile was loaned by its owner to his son to be used as a jitney. The son took out a jitney license in his own name and retained all of the proceeds of his business. The car was impounded by the sheriff and found to contain a large quantity of whiskey. Proceedings were instituted for the forfeiture of the car and the father interposed his claim of ownership of the machine, contending that he had no knowledge of the unlawful use made of it. The father's claim was sustained by the court and the machine was ordered returned to him. Of course, the claim of the prosecuting authorities was that under the above facts it was only reasonable to assume that the father had full knowledge of the use being made of his car, if, indeed, he had retained any interest in the car at all. But the court refused to draw this inference.

INSTALLMENT contracts and chattel mortgages covering automobiles usually contain a provision entitling the creditor to declare the whole indebtedness due at any time, and to retake the

car if the full amount due is not immediately paid, where he reasonably believes that the debtor is causing or permitting the value of the car as security to become impaired, by improper use or abuse of the same. In construing such a provision the courts require a strict adherence to the terms of the agreement. If the creditor retakes the car without reasonable cause, or, having reasonable cause, fails to demand payment of his debt before retaking his act is unlawful, and he may be held liable in damages. This decided very recently by the court of civil appeals of Texas.

AMONG the classes of debts which are not obliterated by a discharge in bankruptcy, are those arising from the commission of wilful and malicious injuries. In a recent Georgia case a motorist secured a discharge in bankruptcy after an accident in which his car collided head-on with another car. According to the dissenting opinion filed by one of the judges the evidence showed that the motorist in question and another were approaching in their cars from opposite directions; that the former held his course near the middle of the road, although there was ample room for him to turn out and a suitable roadbed on his right; that his car was much larger than the other; and that after the accident he continued on without stopping.

A majority of the court, without discussing the matter, held that these facts do not show a wilful and malicious injury so as to save the injured motorist's claim from the bankruptcy discharge.

Answers to Questions.

Q. Can you furnish any authoritative decisions covering the right of a state to tax an automobile stored in the state, where the owner resides in another state?—F. L. S.

A. You will have to give me some of the details of the particular case you have in hand to enable me to give you references to decisions exactly in point. Is the car stored temporarily or for a definite and prolonged period? What is the ultimate purpose in view—to sell the car in the state where it is located, to have it repaired there, to meet personal convenience, because of proximity of residence, or in view of some particular future use of the car?

The general rule of law governing the broad question of the taxation of automobiles of non-residents which happen to be in a state may be stated as follows, though slight circumstances may require the application of qualifying rules in particular cases:

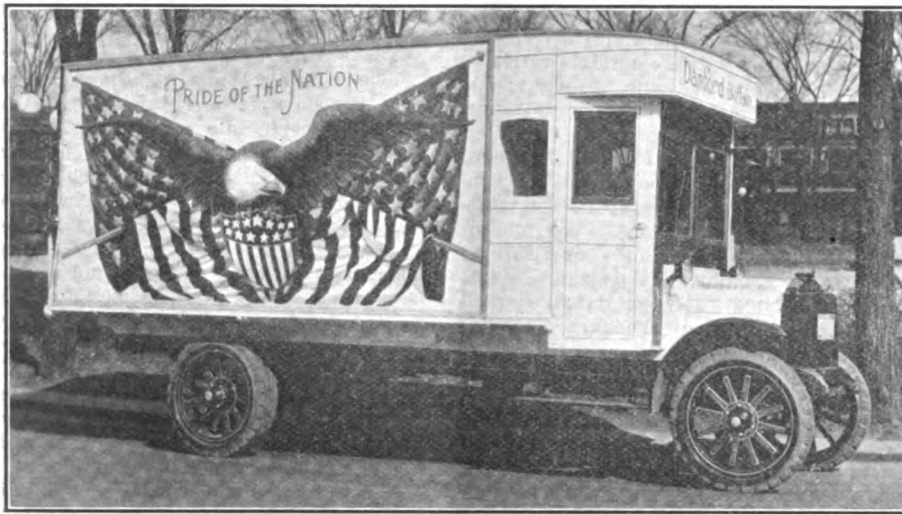
A state has a right to tax property which is definitely and permanently located within its borders regardless of the place of residence of the owner. "Permanently" does not have its popular significance, but refers to a present purpose to leave the car in the state without an intention to limit its location there to some temporary object.

Have you any legal questions that are puzzling you? Send them in to the Automobile Editor. The service is free and you may rely on its authenticity.

"DANFORD'S THE MAN"

"DANFORD'S the Man" who not only believes but knows from experience that "catching the public's eye" with his splendidly decorated motor trucks will get him many customers in his moving business in Buffalo. Geo. G. Danford, who is "the Man," has been auctioneer, commission man and mover there for many years, and he has learned during this time that the new and novel attracts the public at-

tention. He says: "Most truck owners forget that their trucks are traveling advertisements of their business, and that the public judges you and your service by the appearance of your vehicles. So we have adopted a pictorial style of 'attention getter' for our Federal trucks. We paint the sides of the vans as shown in the picture with patriotic subjects, using those of universal appeal.



George G. Danford Is a True American and He Wants the World to Know It.

"ONE of these, 'The Dawn of Freedom,' depicts the famous scene of 'Washington Crossing the Delaware.' Another shows the national colors and eagle known as 'The Pride of the Nation.'

"I like to think that there is a relative meaning in these scenes, which we have chosen for our trucks. The Dawn of Freedom

marked that eventful day in our Colonial struggle when General Washington with his valiant band dared to discard the old regime and stake all on the outcome of the new. In like manner, we today have 'cut out' the old way of the horse and wagon with all its tedious hours of toil and hardships and have acclaimed our freedom from the old methods and adopted the new mode

of transportation, which has become, like the American Eagle and Flag, 'the Pride of the Nation,' and the great helpmate to man and handmaiden of success.

The public acknowledges its appreciation of our desire to please the eye and mind by asking for this particular truck. They seem to think that it is an honor to have this beautifully decorated vehicle drive up to their home and move their effects—and we keep the truck looking so bright and shining that they will keep on thinking this. Their pride is our pride. Their vanity our livelihood.

"In other words, we spend a great deal of money in thus painting our Federal Trucks to please the public taste for the beautiful. We believe there is little enough sentiment in business.

In addition to this appeal, we give the best service that we know how to give through twenty-five years of experience and, in return, we receive the patronage and good will of the people of Buffalo."

KALAMAZOO GET BIG ORDER

THE Kalamazoo Motors Corporation, Kalamazoo, Michigan, manufacturers of Kalamazoo Motor Trucks, has recently closed a contract with the Highway Contracting and Equipment Company of Chicago, calling for over \$500,000 of Kalamazoo Dump Trucks with 1½ yard bodies, to be delivered in regular monthly allotments.

The Chicago Company has contracts for road construction covering an extensive field and is amply financed, having in its personnel a number of well-known Chicago business men of high standing and wide experience.

The operation of the Highway Contracting and Equipment Company is unique in many respects. Each truck operator owns his truck and is under contract with his company guaranteeing his services, thereby enabling the company to avoid the usual truck driver labor turnover which, it claims, has been detrimental to the fulfillment of many hauling contracts in the past.

Each truck owner is provided with a life insurance policy by the company and, also, an accident and health policy providing a weekly income sufficient to permit the employment of a substitute driver with-

out impairing the owner's income from the work of his truck.

Shipments are to be started May 10th.

Richard C. Bubna has joined the tank division of the Ordnance Department at Rock Island Arsenal, Ill., as a tank and tractor designer. He was previously assistant to the mechanical engineer of special machine design at the Lynite Laboratories, Cleveland.

Leonard L. Baker, who was formerly doing specification work for the Denby Motor Truck Co., Detroit, has accepted a position as engineer for the Apex Motor Corporation, Ypsilanti, Mich.

Harry E. Radack has been made purchasing agent for the Lawrence Aero-Engine Corporation, New York City.

DUMP BODY FOR RUGGLES' TWO-TONNER

THE Ruggles Motor Truck Company, Saginaw, Mich., announces that the dump truck, recently manufactured for use in handling coal, dirt, gravel and other materials is finding ready sale.

THIS equipment consists of a Woods steel dump body mounted on the standard Ruggles two-ton chassis and equipped with the Woods horizontal hydraulic hoist. The dump body has a capacity of 1½-half and 2 yards.

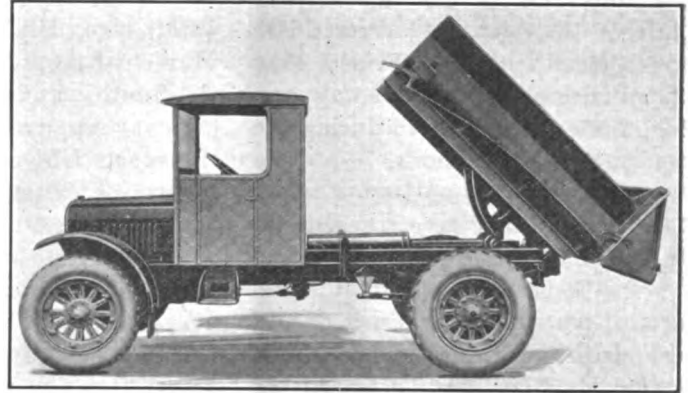
The Ruggles two-ton chassis used with this dump body truck has a 38 horsepower Ruggles engine with four inch bore and 5 inch stroke. The rear axle is a Ruggles designed double reduction, with air-

tight steel housing to protect the working parts from dirt, water and other harmful substances.

and leg room for the operator.

Standard equipment on this truck consists of oil lights at front and rear,

Ruggles
Two-Ton Truck
with Woods
Steel Dump Body
for General
Haulage Work.



The driver's seat is roomy and very comfortable with deeply padded cushion springs and plenty of arm

tools and kit, including jack, wheel puller and hand tire pump, seat and cushions, a substantial hand horn.

Interesting Figures

AN INTERESTING side-light on business conditions in general, and particularly in the automotive field, is found in the figures shown by the International Harvester Company of America on the sale and delivery of International Motor Trucks this year.

the river. These carloads would make a single train 14 miles long or 33 average trainloads of 50 cars each. The freight charges approximate \$247,000.

If all these trucks were placed in service at one time they would be capable of moving the 12 million bale cotton crop of the entire United

ness was partly due, at least to the free inspection service which has been in force at the 92 company branch houses for over two years.

International Motor Truck owners say that service is the 'King Pin' in motor truck hauling and that the International 90-day inspection service is a real safeguard against hauling delays.



International Speed Truck Used as an Advertising Medium.

UP TO APRIL FIRST, a total of 1,651 carloads of International Motor Trucks have been shipped from the truck factories at Akron and Springfield, O., to be delivered to purchasers. Of the total, 892 carloads were shipped west of the Mississippi river and 759 carloads were for delivery east of

States the usual average haul in 20 working days. The mileage to accomplish this task would amount to 10,000,000 miles, a distance equal to 400 times around the earth at the equator.

In giving out these figures, the sales department indicated that the satisfactory growth in truck busi-

Albert Nelson has purchased the Westring Auto Co., Fairmont, Neb.

F. J. Patton has bought the interest of J. J. Brownswell in a garage at Blue Springs, Neb.

Carleton E. Stryker is an electrical tester for the Los Angeles Railway Corporation, Los Angeles, and is also doing design work on heavy fuel burning apparatus for the Scherfee-Block Fuel Vaporizer Co., also of that city. He was previously designer for the Celite Products Co., Lompac, Cal.

Ralph White, formerly designing engineer for Edward G. Budd Mfg. Co., Philadelphia, has accepted a position in a similar capacity for the Rodenhausen Excelsior Wagon Works, also of Philadelphia.

H. Evert Thompson has been engaged as consulting engineer by the Stevenson Gear Co., Indianapolis. He was formerly president and designing engineer for H. Edison Thompson, Inc., also of Indianapolis.

Rollins C. Syfan has severed his connection with the Stroud Motor Mfg Association, San Antonio, Tex., where he was assistant secretary. His future plans have not been announced.

Clifford R. Rogers has been engaged as chief draftsman for the C. L. Best Tractor Co., San Leandro, Cal. He was formerly assistant chief engineer for the Moreland Motor Truck Co., Burbank, Cal.

HIGHWAY TRAFFIC ASSOCIATION MEETS

THE ANNUAL meeting of the National Highway Traffic Association was held in the assembly hall of the Automobile Club of America, 247 West 54th Street, New York City, Friday, May 12, an afternoon and evening session, dinner being served during the interim between sessions.

MEMBERS were present in good numbers and all evinced a keen interest in the reports of the various committees and the addresses of the several speakers. Arthur H. Blanchard, president of the association, was chairman of the afternoon session, while the chairman of the evening session was David Beecroft, vice-president of the North Atlantic Division of the association.

The program follows:

Afternoon Session.

Chairman of Session, Arthur H. Blanchard, president National Highway Traffic Association; report of national committee on Uniform

Highway Signs, chairman Elmer Thompson, secretary, Automobile Club of America; report of national committee on Traffic Capacity and Widths of Highways Outside of Municipalities, chairman, Herschel C. Smith, assistant professor of highway engineering and highway transport, University of Michigan; report of national committee on Status of the Construction of Highway Curves and Recommended Practice to Increase Safety to Traffic, chairman, H. Eltinge Breed, consulting highway engineer, New York City; report of executive committee on Highway Improvement Creed of the National Highway Traffic Association; Annual Report of the Secretary, Elmer Thompson; Annual Report of the Treasurer, George H. Pride.

Evening Session.

Chairman of Session, David Beecroft, vice-president North Atlantic Division, National Highway Traffic Association; Address of Welcome,

Colonel Arthur Woods, president Automobile Club of America; response and address on The Railroad as an Operator of Highway Transport, Arthur H. Blanchard, president National Highway Traffic Association; report of National Committee on Regulations Covering Speeds, Weights and Dimensions of Motor Trucks and Trailers, chairman, George H. Pride, president Heavy Haulage Company of New York City; report of National Committee on License Fees and Motor Vehicle Taxation, chairman, Henry G. Shirley, chairman Good Roads Board, American Automobile Association; report of National Committee on Highway Transport Franchises, chairman, F. W. Fenn, secretary National Motor Truck Committee, National Automobile Chamber of Commerce; report of National Committee on Highway Transport Clearing Houses, chairman, Tom Snyder, secretary National Association of Commercial Haulers. (For Mr. Snyder's report see page 275.)

REMOVABLE CYLINDER WALLS.

PRACTICALLY no user of motor trucks for any considerable period has escaped the expensive inconvenience of a damaged cylinder wall in his engine.

It is a rather common malady with trucks, whose work is heavy, and its cost has always been mighty high since it meant removing the engine from the truck, disassembling it, and then going through an expensive reboring process.

It is little wonder then that a crowd of more than 50 motor truck users cheered loudly in Lincoln, Nebraska, recently when two mechanics removed and replaced one of the cylinder walls in a GMC truck in the short space of 21 minutes.

Removable cylinder walls, a distinctive and exclusive feature of GMC construction, made the feat possible. In actual practice, this would seem to be reducing mean

actual repair costs for cylinder replacement in a GMC approximately 85 per cent over that of the common type of truck engine. Moreover, the hours saved mean profits, for the truck in the shop is not a wage earner. A temporary layup may cause little inconvenience—but usually they're of longer duration.

MOTT SATISFIED MOTOR TRADE COMING BACK STRONG.

C. S. MOTT, vice president and chairman of the advisory staff of General Motors, has returned from New York, where he attended the meeting of the board of directors. Mr. Mott reports that directors and officers after reviewing the situation expressed satisfaction that the automotive trade was now in a healthy condition with demand for certain types of cars exceeding supply.

HENDRICK'S COMMERCIAL REGISTER.

THE 30th edition of Hendricks' Commercial Register has 2324 pages, 8½ by 11½ inches, with type six pages, 7 by 10 inches, presents a greatly improved appearance as the text matter has been opened up leaving a space between the columns making it more readable, as well as more attractive, giving more space for checking and memoranda. The larger pages taking more matter naturally requires fewer pages and gives a thinner book.

Hendricks' Commercial Register lists completely the electrical, engineering, machinery, building, manufacturing, chemical and similar industries. Many of the subjects are treated in a different manner than formerly.

Published by S. E. Hendricks' Co., Inc., 70 Fifth Ave., New York. Price \$12.50.

Government Motion Pictures Boost Good Roads Movement

IN LINE with its policy of informing the public, especially those who pay the taxes, as to the economies that may be effected in the construction of highways, as well as the proper methods of construction, the United States Government, through the Bureau of Public Roads, Department of Agriculture, has just completed for free distribution and use in motion picture houses as well as at conventions, chautauquas and educational conferences throughout the country, two reels of pictures showing in detail the construction of the various types of asphalt roads. The pictures were exhibited for the first time at the recent American Good Roads Congress in Chicago.

THE pictures were taken last summer in New York, New Jersey, Pennsylvania and other states under the direction of E. J. Wulff, senior highway engineer, U. S. Bureau of Public Roads, and E. J. Kelley of the Motion Picture Division, United States Department of Agriculture. The pictures were produced particularly for the purpose of showing how the best results may be obtained in asphalt construction. They are loaned to responsible parties free of charge, except for transportation costs.

The first reel, entitled "Building Bituminous Roads," indicates the wide application of bituminous materials in highway construction. It shows the character of the bituminous materials and demonstrates the principal laboratory tests used in determining their suitability for the various types of roads to meet various climatic and traffic conditions. A portion of the reel shows in detail all the various steps that should be taken in surface-treating a macadam pavement. This scene opens with a large motor truck-distributor spraying the bituminous material upon a macadam surface

in the suburbs of Philadelphia, Pa. The distributor is followed closely by a horse-drawn wagon spreading the stone chip covering. The bituminous macadam pavement is a type much superior to plain or surfaced treated macadam. In its construction, the asphalt is treated and applied either by mechanical or by hand distributors.

The use of the small hand pouring pots in applying the asphaltic binder is demonstrated on a road near Pittsburgh, Pa. This demonstration is followed by views showing the mechanical distribution of the asphalt by motor trucks on a project in Westchester County near New York City. The trucks are first

LIGHT-EDGED ROADS CRUMBLE UNDER MOTOR TRUCK TESTS.

Some of the lighter sections of the Bate experimental road failed under the traffic of light trucks driven along the edges of the surfaces on the first day of the test. The road, which was especially constructed for the experiments now being conducted by the State Highway Department of Illinois in cooperation with the Bureau of Public Roads, United States Department of Agriculture, is 2 miles long and consists of numerous sections of different types of construction.

On March 30, the day the road was opened for the tests, 12 trucks with bodies removed to make a load of 2500 pounds on each rear wheel were started on the trips, which will continue with increasing loads until the suitability of each type is determined. The trucks were driven so that the outside wheels were on the edge of the paving, and almost immediately some of the sections began to fall. This was expected, as the sections were of light design and intended to demonstrate the futility of such construction.

The road will be subjected to a number of tests under the destructive pounding of the trucks, and it is expected that much valuable information will be gained for use in future road construction. In addition to specialists assigned to investigate soil conditions, temperature effects, and other factors, five engineers are constantly observing the effect as the trucks continue their daily grind. The experiments will continue until all the sections have been thoroughly tested.

shown loading at a railroad siding from huge tank cars. They then leave for the road where the material is applied under pressure at the rate of one and one-half gallons to the square yard. Laborers are pictured covering this material with stone chips. A powerful roller then compacts the pavement. The road is then shown, by the passing of traffic, to be ready for immediate use. According to engineers one of the big advantages of asphalt pavements is that they can be opened to traffic as soon as constructed.

Building Mixed Asphalt Pavements.

The second reel, entitled "Building Mixed Asphalt Pavements," shows methods used in constructing both asphaltic concrete and the sheet asphalt types of pavement. This reel contains views of plants at Pittsburgh, Pa., and Columbus, N. J., where the stone, sand and asphaltic binder are heated and mixed. The "mix" is loaded upon trucks and hauled to the road. Here it is spread with rakes and then compacted by rollers. This picture shows that the mixed types may also be opened to traffic immediately after their completion. The pictures demonstrating the construction of asphaltic concrete roads were taken on a new road under construction between May's Landing and Pleasantville, and leading into Atlantic City, N. J. The pictures of sheet asphalt construction were taken on a road near Columbus, in Burlington County, N. J. This county now has sixty miles of sheet asphalt roads on a macadam base. The pictures show, in a novel way by means of an animated diagram, the relative proportions of sand, stone, and asphalt binder in each of the two types of pavement.

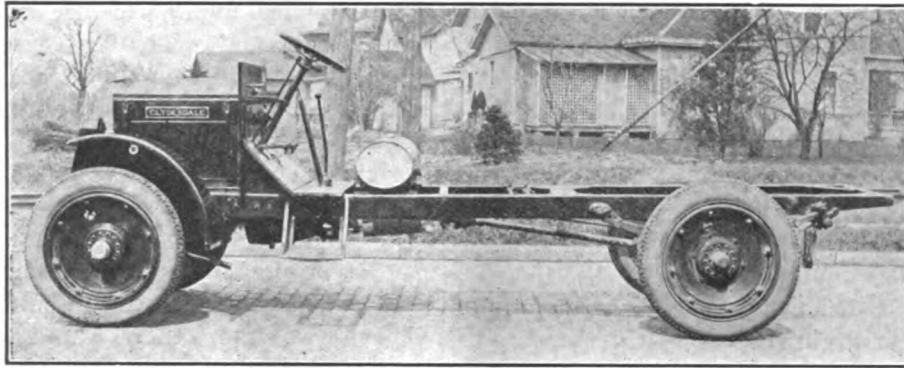
The government pictures offer an interesting and instructive addition to any motion picture programme. Each reel is approximately 900 feet long.

Clydesdale All-Steel Truck

A BRAND new member of the Clydesdale family, an "all-steel truck with speed," made its debut May 1st, and arrangements are being made for quantity production, according to an announcement made by A. J. Banta, vice-president and general manager of the Clydesdale Motor Truck Company of

Clyde, O., a concern well known to the industry.

This all-steel truck, supplementing the company's line of medium and heavy duty vehicles, has an overall capacity of 6850 pounds, including weight of chassis, which is 3100 pounds, giving a carrying capacity of body and load of 3850 pounds.



Light and Graceful in Design This Truck Combines the Reliability of the Clydesdale Product with the Flexibility and Ease of a Passenger Car.

LIGHT and graceful in design, the truck combines the reliability of the Clydesdale product with the flexibility and easy running qualities of a passenger car.

The chassis, including starting and lighting systems, is to be offered at \$1485 f. o. b. Clyde. This price is only possible, explains Mr. Banta, "because of the recent reductions in the cost of materials."

"This chassis marks a distinct advance in the construction of light

trucks, and a glance at its specifications will convince the most skeptical that it is built not for looks and speed alone, but on time-tried principals for hard practical service," said Mr. Banta.

"Our announcement, I believe, will prove of interest to the hundreds of Clydesdale truck owners who have found the vehicles reliable, serviceable and efficient, as well as economical in upkeep. And I am sure we have in this all-steel truck

a vehicle that will uphold the reputation of the company and justify our pride in it.

"Months have been spent in scientific tests of this chassis. The construction has received the approval of the most eminent automotive engineers in America, while engineers and designers alike have pronounced the chassis one of the best offered the truck-buying public at a popular price."

Distributors and dealers from various parts of the country, who have visited the factory, are no less enthusiastic about this all-steel chassis and have given their unqualified indorsement. Its sterling quality, its longer wheelbase, its increased loading length, and other features are distinctive.

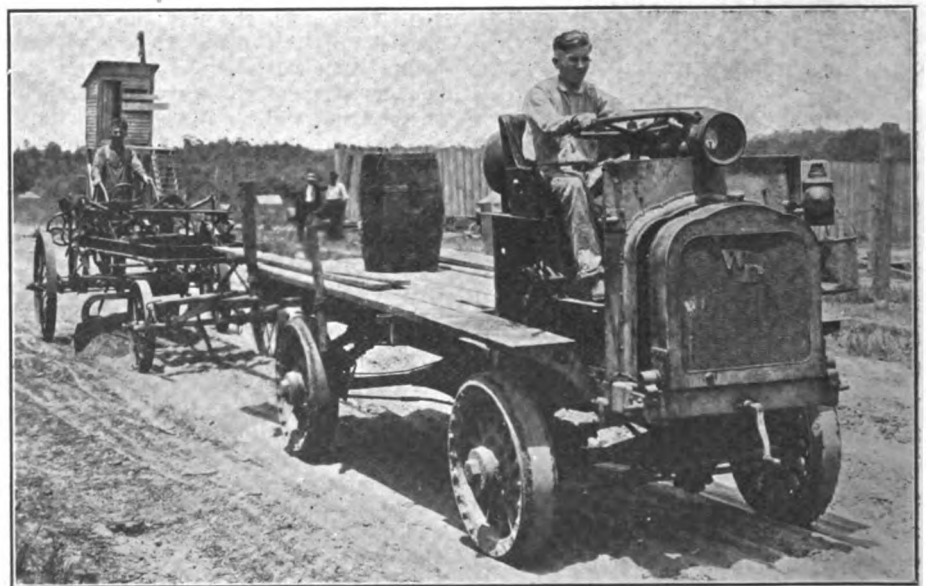
Elmer F. Roudenbush is an instructor in automobile and tool design in the Elm Vocational School, Buffalo, N. Y. He was formerly truck designer and checker for the Stewart Motor Corporation, Buffalo.

TRUCK USED TO DRAG ROADS

THOUGH road dragging is strenuous work and is commonly considered a tractor job, many County Highway Departments have used their motor trucks for this purpose, very satisfactorily.

As an illustration of the success with which highway departments are meeting in the use of motor trucks, the following instance is cited:

Douglas County, South Dakota, dragged 1,507 miles of road with an FWD 3-ton truck and a large drag at a cost per mile stated to be \$357, the figure including cost of gasoline, oil, driver and repairs.



Dragging the Roads with a Truck Instead of a Tractor Proved Economical and Efficient When Tried by Commissioners of Douglas County, S. D.

HIFLEX SPRING SUSPENSION

THE Traylor Hiflex Spring Suspension is standard on all Traylor Truck models. This device, however, can be attached to practically any make truck; the main difference being in the size of the hinge holding the helical springs or, perhaps the spring shackles.

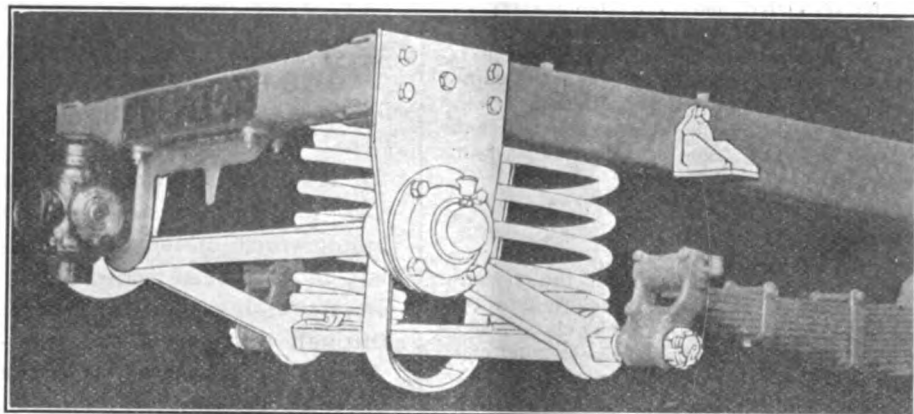
THE hinge consists of two steel cross bars, which are attached by two steel forge arms at the ends of the two cross bars. The four ends of the two cross bars are machined and constitute the bearing points. The four bearings are bushings pressed into a ball socket, which fit into side members bolted to the frame.

Because of the rigidity of the hinge, the two helical springs work simultaneously, each deflecting or extending to the same degree. Road shocks are absorbed by the helical springs prior to their reaching the chassis; consequently, prolonging the life of the chassis, saving the tires and doubling the tire mileage, it is claimed.

It is further stated by the manufacturer: That, by the use of the spring suspension, the necessity of pneumatic tires is eliminated, as all of the advantages of the pneumatic tires are given by the spring suspension.

There are easier riding qualities, and there is also a considerable saving in gasoline and oil. The saving being due to the fact that there is a tendency for the helical springs

The spring suspension assembly consists mainly of a rigid hinge, attached to which are two spring seats, upon which rests the two helical springs. These springs at the top rest in two spring seats attached to two angle irons assembled to the cross members of the frame.



Showing Method of Springing Adopted as Standard by All Traylor Truck Models. This Device Doubles Tire Life It Is Claimed.

to hold the load in its original position when the truck is running, and when the rear wheel encounters a rut in the road, the load does not enter into the rut but only the wheel. Therefore, it is only necessary to use power to pull the wheel from the rut as opposed to pulling the wheel and the load from the rut when the suspension is not used.

The body shown is mounted on a special Traylor Chassis, equipped with Traylor Hiflex Spring Suspension. It is all steel construction, equipped with electric lights and fresh running water, and also contains show cases, ice boxes, etc. It

will be used by the Atlantic City Sea Food Auto Stores Company to sell their fish products. The fish are caught and immediately loaded on the bus store and delivered direct to the consumers.

Frederick W. Beinecke has been elected vice-president and general manager of the Studebaker Sales Co. of Newark, N. J., having been formerly New York City service manager of the Studebaker Corporation of America.

D. M. Ackerlind has accepted a position as designer and layout man in the four-cylinder passenger-car division of the H. H. Franklin Mfg. Co., Syracuse, N. Y. He was formerly a designer in the engineering office of the Ordnance Department at Syracuse.

Forest S. Baster, until recently experimental engineer for the Grant Motor Car Corporation, Cleveland, is now assistant chief engineer for the H. J. Walker Co., Cleveland.

L. H. Amrine, formerly vice president of the Scudder Motor Truck Co., St. Louis, has been made assistant sales manager of the Dorris Motor Car Co., also of St. Louis.

Ethel H. Bailey has severed her connection with the aircraft division of the Bureau of Construction and Repair, Navy Department, City of Washington, where she was assistant to the head of the specification department. She has not announced her plans for the future.

Emil S. Anderson, formerly general manager of the Hunsaker & Woodmancy Motor Co., Pasadena, Cal., has been elected president and engineer of the A-C Automotive Service Corporation, South Pasadena.



Atlantic City Sea Food Auto Stores Find That the Suspension Afforded by the Hiflex Spring Has Many Distinct Advantages.

Busses Preferred to Subway System Says New York's Mayor

Flays Proposed Expenditure of Half Billion by Transit Commission and States Estimates Board Would Appropriate \$25,000,000 for Purchase of Motor Busses.

NEW YORK, May 14.—Using a report of the transit commission's proposed subway construction programme as a text, Mayor Hylan recently attacked the commission and charged it with the intention of "saddling on the backs of the rent and taxpayers a cost of more than a half a billion dollars."

The mayor asserted that if the transport commission and Chairman George McAneny had really wished to help the people they would have aided the city administration to start bus lines to give immediate traffic relief, and declared that the Interborough and B. R. T. must not be permitted to seize the new lines to be proposed by the commission at an estimated cost of \$250,000,000, and "subject the people to the extortions and indecencies which have characterized their operation on existing lines." The mayor said:

"Many of the papers carry the announcements that a new transit plan, to cost \$250,000,000, is to be put forth soon by the State Transit Commission. Certain information about this plan has supposedly leaked out inadvertently. The details which have been given apparent premature publicity are such as are expected to impress the public with the idea that it is going to get something out of the wonderful programme soon to be launched by the State Transit Commission. But some vital things have not 'leaked out' and I think the tax and rent payers might as well be supplied with some of the missing information.

"The Board of Estimate and Apportionment is prepared to appropriate \$25,000,000 for the purchase and operation of automobile busses of an up-to-date type, well ventilated, well lighted, well heated, commodious and sanitary. And this operation will be at a five-cent fare. If a favorable decision is rendered to the city in the case now pending in the court, a fleet of municipal busses will be instantly supplied and the people will be given the transportation facilities they require.

"It is well to remember that McAneny was a party to the execution of the dual subway contracts which inflict an annual burden of about \$10,000,000 in the budget on the taxpayers. McAneny resigned his public office to take a position on a newspaper in this city at a reported salary of \$50,000 a year. Now he is back again on traction work as a member of the State Transit Commission. It was he who favored a lease of the subways, owned by the city, to the Interborough and B. R. T. I fought this plan, as did many other citizens, when it was proposed some years ago. I shall oppose just as vigorously the plan which McAneny now favors of dumping the dilapidated surface lines on the city."

HIGHWAY MAPS SHOW ROAD CONDITIONS TO MOTORISTS.

THE first road condition map for the convenience of motor truck drivers and tourists has just been issued by the state highway department through the maintenance division. The maps this year are to go a great deal more into detail regarding conditions of the roads and in addition to showing the improved county roads as well as trunk lines and various state parks are also noted.

In addition to giving all state and county roads the map shows roads which are in good condition, roads under construction, roads poor but passable, impassable roads and detours. Great care is being exercised to make the detail correct in every particular as the maps are to be used for tourists through the summer.

The maps are to be issued the first and 15th of every month from now until fall.

D. A. D. A. EMERGENCY SERVICE LAUDED.

DETROIT, May 12.—Endorsement of the Detroit Automobile Dealer's Association has been given the Detroit Automobile Club's proposed emergency road service for members, which is to be installed shortly. H. H. Stuart, manager of the D. A. D. A., has notified Captain W. S. Gilbreath, manager of the automobile club, that his organization has, by unanimous action, approved the plan.

The D. A. D. A. board's action followed submission of an outline of the plan by the automobile club when it was decided to inaugurate the service.

Manager Stuart, in his message said: "At a meeting of the directors of this association held recently, the matter of your emergency service to members was

brought up and, after going into it carefully and examining the form of contract to be used in making arrangements with the garages, the board endorsed the proposition by unanimous vote.

"We feel that you are planning to give service that will be of great benefit to your members, and, provided the agreement is lived up to by the garages you select, we feel sure that it will work out satisfactorily."

Seeking information about that club's effort, Richard Harfst, manager of the Cadillac Motor Car Company's Detroit branch, wrote the Cadillac Automobile Company of St. Louis. J. James MacGregor, president of that concern, replied favorably, stating in part: "I think it is the finest emergency service for motor car owners that I have ever been in contact with."

FEW CHANGES IN OLDSMOBILE ECONOMY TRUCK.

No radical changes marked the new 1922 Oldsmobile Economy Truck, though numerous refinements were effected that increase the efficiency of this one-ton hauling vehicle.

Most important of all truck changes was the installation of a new type cylinder head and manifold in which three exhaust ports replace one in the former model. This new arrangement greatly increases the cooling efficiency of the Oldsmobile Economy Truck.

New type valve tappet retainers tend to eliminate practically all possible noisiness in the motor. A new cord fan belt, together with a larger water pump, facilitates the cooling system which has been perfected to the highest degree. The improved oil pump betters the lubricating system.

The rear axle is now fitted to make a straight line drive of propeller shaft when the truck is loaded. This, with a new type universal joint, increases and safeguards the pulling efficiency of the truck.

The front and rear springs have been strengthened by additional leaves, the front now having 9 and the rear 11 leaves.

BUS PROTECTIVE ASSOCIATION INCORPORATED.

NEWARK, N. J., May 3.—The New Jersey State Association of Passenger Bus owners has been formed, articles of incorporation having been filed in this city. The association, which is located on Clinton Street, is headed by Louis B. Lessers, with H. W. Meyer, Phillip Bono, J. C. Zahn, W. E. Harper, and Ray Burnett as directors.

The purposes of the organization, according to the papers filed, will be to further the welfare of bus owners, to plan and work out the development of the bus service, to form all operators of the entire state into the one body, to protect the interests of these owners from unlawful and illegal demands and oppression, and to engender public interest in the advancement of bus service.

Maine and Massachusetts Truckers Figure in "Spite-Fight"

Kittery Police Gather in Bay State Drivers—Ipswich Officers Retaliate by Scooping in 16 State-of-Mainers Caught on Wrong Side of Boundary Fence.

LAWRENCE, MASS., May 15.—Maine and Massachusetts police officers are gathering in motor truck drivers operating between the two states.

Here's why, according to a warning to motor truck drivers sounded by Registrar of Motor Vehicles in Massachusetts, Frank A. Goodwin:

"The Maine Legislature recently enacted a law making it necessary for every commercial motor vehicle entering its borders to be registered. As a consequence, state officers are on the Maine side of the bridge at Kittery, gathering in all out-of-state cars. Many operators have been seized and are liable to fines."

But Massachusetts is retaliating. For instance, in Ipswich, in the last five days, Chief of Police Edwards Leavitt has scooped in 16 Maine motor truck operators whose cars had no Massachusetts plates.

In Newburyport, over Sunday, the police arrested six persons whose motor trucks bore only Maine plates. Most of those arrested were leaving this state on their way to Maine.

INTERNATIONAL STEEL PRODUCTS CHANGES.

HARTFORD, WIS., May 12.—The International Steel Products Co. has been reorganized into a new corporation under the name of the International Stamping Co.

The new corporation has been re-financed by some of the members who were in the old corporation. This will give the new concern ample time to carry on whatever business may come their way.

The company will continue to manufacture mufflers, and automobile specialties; also, some electrical wireless specialties.

MAMMOTH MOTOR BUILDING FOR DETROIT.

DETROIT, May. 10.—Excavation work has been started here for what will be the largest building in the city, from the standpoint of ground area, although the structure will be but one and two stories in height.

The building, to be located on the large city block between Canfield and Forest avenues, fronting on Woodward and Cass avenues, may become the permanent home of the Detroit Automobile Show.

The frontage on Woodward and Cass avenues will be 700 feet long, the structure being 426 feet deep. The frontages, to be designed for shops and offices, will

be two stories in height, the center of the building being one story. One arcade will run through the center of the building if the automobile show makes its home in the structure. Otherwise two arcades will be built.

The structure will cost, when completed, about \$1,000,000, and will have more than 300,000 square feet of floor space.

An exhibition hall seating 2500 persons will be a feature of the building. This will relieve, to an extent, the shortage of convention halls here, according to E. L. Dixon, secretary of the Detroit Convention Bureau.

If the auto show makes its headquarters there the building will be so arranged as to provide for 121,800 square feet of floor space on one floor.

DIXIE HIGHWAY MEETING IN JACKSONVILLE.

JACKSONVILLE, FLA., May 14.—This city has been selected as the meeting place of the Dixie Highway Association for its 1922 meeting. The gathering has been set for May 26 and 27 by Judge M. M. Allison, of Chattanooga, president.

William F. Metzger, director, and Captain W. S. Gilbreath, manager of the Detroit Automobile Club, have been named as delegates from Michigan for the meet-

ing. Captain Gilbreath is founder and first field secretary of the Dixie Highway.

One of the features of this year's gathering will be a big automobile tour from Chattanooga to Jacksonville. Delegations from all towns and cities along that section of the route are to join the caravan.

Frank F. Rogers, state highway commissioner and Frank Hamilton, of Traverse City, are to attend the meeting; Mr. Rogers as a speaker and Mr. Hamilton as a director and delegate.

Since organization of the Dixie Highway Association in 1915, many hundreds of miles of improved road have been laid down, and it is hoped by the officers of the association that another two or three years will see a completed route from Sault Ste. Marie on the north, to Miami on the south.

Commissioner Rogers, in accepting an invitation to attend the Jacksonville meeting, stated that Michigan would make every effort to complete the gaps in the East and West Michigan Pikes in 1922. These are both links of the Dixie, and so is trunk line No. 12, from St. Ignace to Sault Ste. Marie in the upper peninsula.

LONG BEACH COMPANY ADDS 12 NEW BUSES.

LONG BEACH, CAL., May 3.—Twelve busses have been added to the 27 originally owned by the Long Beach Transportation Company of this city at a cost of \$50,000, bringing the total equipment to 39. These busses, which are expected to arrive this week, are of the larger type, have unusually fine appointments and are especially designed for the work to be done.

TOLEDO INTERURBAN BUS LINE FORMED.

TOLEDO, O., May 13.—Incorporators of the newly formed Toledo Interurban Bus Co., are: J. A. Walsh, E. G. Stradle, H. H. Biggs, G. L. Solomon, and E. C. McAntee, all of this city. The articles of incorporation set the capitalization at \$100,000 and grant permission to operate busses for the transportation of passengers, not only in this city, but between Toledo and other cities and towns closely adjacent.

Fred Wilson, sales manager of the Stutz Motor Car Company of America, Inc., of Indianapolis, Ind., has announced the appointment of the Stutz Chicago Co. as distributors of Stutz Motors for the Chicago district. The new organization will be under the management of A. S. Johnson, who, for a number of years, has been identified with the Stutz in that territory.

James D. Cathey, Inc., New Orleans, has increased its capital stock from \$75,000 to \$150,000, in anticipation of greater business when the company takes over the Lincoln in connection with the Ford agency. Cathey has seven sub-agents in New Orleans, who will also handle the Lincoln.

FORD TO BUILD ONE-TON TRUCK WITH "THREE-IN-ONE" BODY.

FORD one-ton trucks will be furnished complete with the newly designed "Three-In-One" body beginning some time about the middle of the summer states an official of that company.

The Ford three-ton truck also will be placed on the market later in the summer, said the official, the plans being already definitely decided on.

G. P. Bentley, formerly layout draftsman for the Supreme Motors Corporation, Warren, Ohio, has accepted a position as layout draftsman and designer of special machinery for the Youngstown Pressed Steel Co., also of Warren.

American Steam Truck Gets Into Production in Chicago

First Model Delivered to Local Ice Company Has Successful Tryout. Invention of Era C. Jacobson Features "Fool-Proof" Burner and Boiler.

CHICAGO, MAY 10.—Moving about so quietly that observers might believe it was propelled by radio instead of steam, the first "made in Chicago" steam truck with a "fool proof" burner and boiler has entered the service of the Kosmos Ice Company, as the forerunner of what the manufacturers believe will mark a most important step in transportation of freight and passengers since the invention of the gasoline engine for motor cars. The truck, an epoch in Chicago industry was delivered yesterday.

The inventor is a Chicagoan by adoption, Era C. Jacobson, of 1414 Thorndale Avenue. He came here 10 years ago when a tornado moved his Kentucky furniture factory to parts unknown, and, since that time, has quietly and persistently applied himself to the perfection of a quick burner that would ignite from the dash by a turn of a button and a boiler that could both carry great reserve of steam and overheat repeatedly without injury. These two requirements have been sought for 20 years, the general adaption of the moving parts of a steam engine as applied to motor cars having long ago been satisfactorily solved.

There are only 17 moving units in "The American Steamer." Greatest secrecy in the development of patents and organization has marked the successive steps that brought Chicago's newest industrial baby into the family of motor car manufacturers who have sought to put Chicago on the motor map.

R. R. Howard, president, and H. F. Gay, general manager of the new American Steamer Car Company, were respectively vice-president and sales manager of the Channell Chemical company when Jacobson, the steam burner inventor, accidentally interested them. After a careful investigation and without explanation to their friends, they began the practical steps in the development of the new steam car and now head a \$2,000,000 company.

The new steam passenger car, delivery of which will begin May 15, will market for less than \$2,000, in a field where the steam car prices range from \$2,600 to \$9,000, it is stated. The plant is at 500 Bloomingdale Road.

RAILROAD TAKES ON MOTOR BUSSES.

WARREN, O., May 12.—Youngstown, Niles and Warren will have motor bus service if the plans of the Pennsylvania-Ohio Electric Company mature.

It is understood from reliable authority that already five new busses have been

ordered from the Bender Body Company of Cleveland, and that more will be added after the first have been placed in operation.

The busses, which are of limousine construction, will seat 18 passengers. They have an overall length of 19 feet, six feet inside clearance and are 80 inches in width. A space for luggage occupies the front of the coach with the seat for the driver. All seats face forward; no lengthwise seats being used.

The first five coaches will soon start operating, and, it is understood, will be run on a half-hour schedule between Youngstown and this city, making the round trip in one hour and a half.

LARGE RELATIVE GAIN IN MOTOR TRUCK SALES.

TRINIDAD, BRITISH, W. I., May 1.—

The outstanding feature in the local motor-car situation is the relatively much greater demand for motor trucks than for passenger cars, there being approximately two sales of commercial vehicles to one sale of cars. In addition to obvious economies accruing from motor-truck transportation of cocoa and other

produce and from all kinds of equipment for use in the petroleum districts, there has lately arisen a demand for motor omnibuses for carrying passengers over the roads of the islands. Usually, in the case of motor trucks or omnibuses, only the chassis is imported, the body work being made locally.

Until about the time of the armistice hardly any motor trucks had been imported into the colony, but since that time the sale has been very rapid, so that now they constitute the most promising feature of the local motor-car business.

Unfortunately, motor trucks have done considerable damage to local roads, many of which are now being rebuilt and repaired. The repair material is being conveyed by means of motor trucks, which the Public Works Department of the Trinidad Government has rented through a local American agency. In order to reduce the weight of trucks with a view to better protection of the roads, a double annual license fee, amounting to £20 per year is now required of motor trucks weighing over 1-ton. The revenue from this tax will be used for more extensive road repairing.

Trailers pay a license fee of £10 per annum. Their use is not yet as extensive, but with economies incident to their use becoming manifest, their prospect seems promising.

WOULD CONTROL WASHINGTON MOTOR BUS LINES.

WASHINGTON, D. C., May 5.—Traction officials of Washington's trolley systems, claiming that the 100 motor busses operated in that city have harmed their business materially, have asked the District commissioners for permission to take over these bus lines and operate them in conjunction with the trolley service, according to a report made public today.

Apparently the proposal was made in good faith, although there is little likelihood of its gaining any particular headway due to the fact that public and press are wholly in favor of the busses, while the same can not be said with reference to the trolley lines which, for several years have been in disrepute with the residents of this city. Then, too, whatever chance there may have been for such a proposal to obtain a foothold has been quashed by the fact that there is a strong rumor afloat to the effect that the traction interests, if allowed to direct the operation of the busses, plan to operate them in such a way that they will be forced out of business.

As a matter of fact, the matter will probably be accorded a hearing and dropped, says a well known authority who also is responsible for the statement that the total curtailment of the trolley revenues by the bus lines approximates less than 8 per cent.

E. J. Ross formerly export manager for Hare's Motors, New York City, has been appointed manager of the New York City office of the Ward Motor Vehicle Co., Mount Vernon, N. Y.

TRUCKS AND BUSES MUST NOW EQUIP WITH MIRRORS.

AUTO buses and motor trucks operating over the public highways of Michigan outside of the corporate limits of cities and villages must be equipped with mirrors, according to a ruling given out by Secretary of State DeLand, and he has asked the state department of public safety to enforce the ruling. Accordingly, all violators will be promptly arrested. He states that he has recently received a large number of complaints from motorists who claim the buses are not equipped with mirrors, and the drivers of which, being unable to see what traffic is coming from behind, often slow up traffic for miles.

Dealers Must Not Loan License Plates

State Official So States After Investigating Conditions in Detroit Garages.

DETROIT, May 14.—Use of dealers' licenses on motor trucks and cars, other than demonstrators, and the loaning of license plates to others will be summarily dealt with, a department of state officials said here Tuesday afternoon, after an investigation of various garages in company with Officer Klein of the local traffic squad.

Complaints have been made against some automobile men, according to the officer, for this practice and the state department official called on a majority of the dealers and notified them to cease the practice.

Under the state law, a dealer is allowed to purchase a number of license plates for use on demonstrating cars and trucks, and the officers assert that sometimes they are permitted to be used by purchasers of new machines for a period of time, pending purchase of new plates. When used trucks and cars are turned in, the officers say plates are removed from them and given to the buyers of other used cars for which no plates have ever been purchased.

WARD OFFERS NEW TIME PAYMENT PLAN.

MT. VERNON, N. Y., May 7.—The Ward Motor Vehicle Company, builder of a well known electric truck has recently announced a unique plan, whereby the purchaser of the truck pays \$100 down at signing the order, \$495 on delivery of the truck and the balance at the rate of \$95.24 monthly for a one-half ton vehicle, and \$135.48 monthly for a three-quarter ton truck, these payments being made for a period of 21 months with interest at the rate of 6 per cent on deferred payments only.

Where trucks are bought in lots of 10, a 10 per cent reduction is made, and five per cent is deducted where 5 machines are purchased at one time.

ATLANTIC CITY ROADS TO BE IMPROVED.

ELIZABETH, N. J., May 10.—Highways in and out of Atlantic City will be extensively improved this summer, the Atlantic county board of freeholders having just appropriated \$750,000 for the rebuilding of the Shore Road, the main route between Pleasantville and Somers Point, and to widen Absecon Boulevard, which leads across the meadows into Atlantic City.

The rebuilding of the Shore Road is to cost about \$700,000. This is a 10-mile stretch of ocean boulevard connecting At-

lantic City and Ocean City, and is a part of the main route to Cape May. The possibility of the establishment of a ferry from the Cape May to Delaware had considerable weight with the freeholders in determining to improve this road, which, with the ferry, would draw thousands of motorists from Delaware who are now held back by the long inland journey necessary.

Absecon Boulevard is to be widened from 60 to 80 feet. The present width, established when the main motor entrance to Atlantic City was opened in 1920, has been found inadequate to handle automobile traffic into and out of the city. The improved condition of New Jersey roads is believed to have caused thousands of persons to make the trip this year by motor instead of by rail as before.

UNLICENSED MOTOR BUS DRIVERS ARRAIGNED.

NEW HAVEN, Conn., May 12.—Claiming that unlicensed motor busses take many fares that rightfully should go to the Connecticut Company, executives of the organization have engaged the services of street car conductors and motor-men obtaining special licenses for them as plain clothes men. Evidence thus gained is placed in the possession of the district attorney with the result that the driver of the unlicensed vehicle is arraigned in court.

FIVE-CENT BUS FARE FOR PARK RIDERS PLEASES MANY.

THE new municipal bus service in Central Park, inaugurated a week ago by Grover A. Whalen, commissioner of plant and structures, attracted thousands of persons, for the ride through the park at a five-cent fare. The cloudy weather Saturday and Sunday morning kept the crowds away, but yesterday afternoon most of the buses were crowded to capacity.

Large numbers of passengers, instead of taking the complete trip up the east drive or down the west drive, alighted in the park at various points of interest.

The buses were in operation until 10 o'clock at night. It is Commissioner Whalen's intention to keep them running until that hour every Saturday, Sunday and holiday.

Rail Interests Seek to Boycott Bus

Roseville, Cal., Union Places Transportation Line on "Unfair List to Labor."

SAN FRANCISCO, May 13.—Roseville, a suburb closely adjacent to this city, and one that depends in great measure for all supplies from the wholesalers of this city, has recently seen a deliberate effort on the part of persons alleged to be working in the interests of the railroad to put the bus and truck lines, plying between the two cities, out of business by means of a boycott.

Already, petitions have been circulated among the merchants of Roseville asking them not to patronize truck shipping lines—in effect a threat of boycott, and members of certain unions have been officially informed that bus lines were not to be patronized, the penalty for so doing being a fine.

The rail interests are doing all in their power to throttle motor haulage of passengers and freight, it is alleged, and are using all of the old familiar patter of: How the trucks destroy the roads that the people have built and paid for, how they are making it hard for the railroads that built up the community, and there is absolutely no doubt but that the traction interests, both steam and electric, will do their utmost to put the trucks and busses out of business. But whether they will be successful is another story.

GOODYEAR ADDS "CROSS RIB CORD" TIRE.

AKRON, May 14.—Announcement of a new cord tire to sell at popular prices was made this week by the Goodyear Tire and Rubber Company. The tire, which will be a companion line to the "All-Weather Tread" line of the company, will be called the Cross-Rib Cord tire and will sell at 20 to 25 per cent less than the "All-Weather Tread" tire.

The tire will be marketed through the Goodyear Service Stations and will not be handled as a jobbing proposition.

This tire will have a lower first cost, but it is constructed from the same high quality 1½ Arizona Pima cotton, and of the same quality of rubber as the "All-Weather Tread" tire, and should give as high a mileage, states the report.

The whole purpose of the new tire is to give dealers a line of merchandise to meet the needs of a class of buyers to whom first cost is an important factor, who may not, perhaps, need all the traction and non-skidding properties that we have built into the "All-Weather Tread." The new tire, too, will enable dealer to get a certain class of commercial business from truck owners who buy in quantities.

The new tire will be 10 per cent, oversize in all except the three and one-half inch clinchers.

G. M. C. Salesmen at Pontiac Factory

Group of 22 Arrives—Others to Follow Fortnightly—Conventions Discontinued.

PONTIAC, MICH., MAY 14.—First of a series of meetings for retail salesmen and salesmanagers of the General Motors Truck Company was held recently in Pontiac.

The 22 sales workers were met in Detroit by General Motor officials and taken on a tour of inspection of the Detroit motor plant. They came to Pontiac during the afternoon, where a visit was made to the great truck plant here.

Members of the party were recruited from Chicago, Indianapolis, St. Louis, Pittsburgh, Detroit and Pontiac.

Caribou Inn was chosen as "host-house" by the truck company officials, where problems of material interest were discussed. Luncheon was served at the Board of Commerce rooms.

"This was the first of a series of meetings in which our sales workers may confer on mutual problems," Mr. Day said. We expect that by the time they have concluded we will have covered the entire country. Mr. Day said the convention plan had been done away with, and the group plan substituted to afford better opportunity for discussion of problems. It is expected these groups will be coming to Pontiac about every two weeks until the field is gone over and each group given an opportunity of visiting the plant here and conferring upon questions of interest.

DEMONSTRATE ACCESSIBILITY OF GMC TRUCK.

Because of the accessibility and ease of repair which have been designed in the construction of the motor of the GMC truck, reports of record speed in repair are not uncommon in the General Motor Truck Company's correspondence. James E. Baird said at the big Pontiac factory the other day that one of their two-ton trucks of the K-41 series was making a run in the mountains of Idaho recently, under especially severe conditions, when one of the connecting rods broke.

"The truck crew were miles away from a repair station," said Mr. Baird, "and all the 'field equipment' they had was pretty much like Gunga Din's. It consisted only of the ordinary tool kit supplied with the truck. They had an extra connecting rod with them, though, and with what tools they had available they made a roadside repair in two hours and 40 minutes. One reason they were able to do the job is that in our connecting rod assembly the bearings are sweated onto the rod, so that they are integral with it. More than that, this method assures unusually good balance in the rod itself—something worth having in truck equipment."

TRUCKS AND CARS SALES SHOW SUBSTANTIAL INCREASE.

MORE stable prices, a larger export trade and increased production of motor trucks is shown in the survey of current business issued by the commerce department.

"From figures available in recent months," the report states, "it is clear that fundamental conditions are much better and there is every reason to expect business to improve steadily, although perhaps slowly.

"With world conditions as they are today there is no likelihood of an immediate boom movement. Reconstruction in Europe is far behind what it is in this country, and in general, big economic movements are worldwide in their scope."

Mr. Baird says that the men who made the repair were not especially trained mechanics, but that the rapidity of repair was made possible by the design of the GMC truck motor and transmission.

HAS YEARLY TRAFFIC OF \$22,000,000.

HARTFORD, CONN., May 8.—Passenger service, valued at more than \$17,000,000 a year, is given by passenger automobiles passing in and out of Connecticut, where the state boundary lines are crossed by the New York-Boston turnpike, according to estimates issued by the State Highway Department. It would cost more than \$5,000,000 a year to transport over the railroads the freight which annually passes through these gateways of the state on motor trucks.

The figures were determined by traffic census made by the State Highway Department at Thompsonville and Greenwich. In the census at Thompsonville, the daily average of passenger car movement for twenty four hours was 2,907, or an average of two a minute.

Figuring the value of passenger service rendered at the railroad rate of 3.6 cents a mile, the passenger service on the Hartford-Springfield road during the two weeks covered by the census was valued at \$327,595.50.

At Greenwich, the value for the two-week interval was \$355,417.04. On the two roads together the value of the service rendered for a year would be \$17,238,326.

L. M. Allison has become chief engineer for the Aviation Engineering Co., Lawrence, Kan.

Packard April Sales Over Half Million

Month's Receipts Equal Half Entire Business Done First Six Months of Year.

DETROIT, MICH., MAY 14.—As an indication of the activity now prevailing in the motor truck and car industry, Packard Motor Car Company's sales for April were in excess of \$6,500,000, or equal to more than half the company's total business for the first six months of its fiscal year, beginning September last.

According to President Alvan Macauley, the purchasing power of the public for automobiles is much greater than was generally believed a few months ago. Says Mr. Macauley: "A survey of the conditions now prevailing among automobile manufacturers in Detroit and elsewhere, indicates that the tide of business is much stronger than anyone anticipated. Some of the factories, in spite of largely increased working forces, will experience difficulty in producing enough cars to fill the orders now coming in. Two months ago, the increased demands for cars appeared to be only a seasonal upturn, which would soon be over, but, now, it is apparent that better known concerns at least have entered into a period of sustained activity.

"The Packard Company, which two months ago had planned to produce a thousand Sixes monthly, is now working on the basis of 1500 cars monthly, a 50% increase and expects to go a production basis of 2000 Sixes monthly in a short time.

MOTOR TRANSPORT REQUIRED IN ASIA MINOR.

CONSTANTINOPLE, May 2.—There will, no doubt, be an extensive market for motor transport in Asia Minor with the establishment of trade guaranties which, it is hoped, will follow the settlement of the Near Eastern question. Motor vehicles will be required for transportation pending the rehabilitation of existing railroads and the building of new ones.

Motor trucks, oil and petrol, for public transport uses are admitted free of duty under the Turkish law covering motor transport in Asia Minor, as published by the Turkish press. The law also states: That the Government will furnish sites for those desirous of erecting repair shops, that the tare of motor trucks must not exceed two tons, that all spare parts and accessories will be admitted free of duty if they conform to a list laid down by the Ministry of National Economy, and that the State will not requisition trucks used for public transport.

D. E. Anderson has become a designer for the Cadillac Motor Car Co., Detroit. He was previously chief engineer for the Detroit Automotive Corporation.

Denby Tells Senate of Naval Oil Reserve

Says Fuel Received by Private Lease Will Be Subjected to Congressional Action.

WASHINGTON, May 4.—Disposition of oil received by the Government under leases entered into with private concerns in the California and Wyoming reserves will be subject to action by Congress, Secretary Denby told the Senate Appropriations Committee during testimony on the Naval Supply Bill.

"We do not feel at liberty to use this without the approval of Congress, said Mr. Denby. He previously had reiterated by explanations made some time ago by him and Secretary Fall in a joint statement that the object of the leases was the development of a war emergency supply of oil for the Navy to be held in storage in large tanks or reservoirs above ground. The naval Secretary said the leases also were prompted by danger of loss of oil from the naval reserves by drainage from adjacent private wells.

"The policy of the Navy Department," said Mr. Denby, "is to get a certain amount of oil regarded as sufficient for an emergency war reserve. We are acting now perfectly legally as the law exists. The department does not intend to nullify the will of Congress."

Assistant Secretary Roosevelt testified that, for the next two years at least, oil taken under the private leases ought to be conserved for the proposed war emergency reserve. He added: There might later be a surplus for current fleet operations.

Secretary Denby urged the committee to increase from \$16,000,000 to \$20,000,000 the appropriation for navy fuel for 1923. The House appropriations of \$16,000,000, he said, were on the basis of a Naval personnel of 67,000 men, which now has been raised to 86,000 men. The department's fleet operation plan, he said, called for the sailing of each battleship 16,500 miles in 1923, with other ships in proportion. This was deemed necessary.

BUS SERVICE WILMINGTON TO COLUMBUS, O.

WILMINGTON, O., May 13.—Bus service of a better kind was started between this city and Columbus a few days ago, and, thus far, has given excellent service, and has been well patronized on the three daily round trips made by the bus operators.

WHEELING-COLUMBUS BUS LINE IN OPERATION.

COLUMBUS, O., May 13.—The Red Star Transportation Service Company has started an hourly bus service between this city and Wheeling, W. Va. The busses, large and comfortably ap-

pointed, leave Columbus at 42 East Rich Street and arrive at destination in five hours, stopping at Zanesville, Cambridge, and other points enroute, also making connections for Byesville, Pleasant City, Woodsfield, Barnesville, St. Clairville, Henrysville and other points along the line.

Thus far, there has been an unexpected amount of travel over this line, and the owners of the company state that they have every reason to feel optimistic over the future of the system.

It is entirely probable that within a short time the routes may be extended to take in other points along the way. Highway conditions are such as to make the operations of busses feasible throughout this territory, and the public is especially enthusiastic over the plan.

GARY MOTOR CORPORATION TO BUILD BUS.

GARY, IND., May 9.—The Gary Motor Truck Company, now known as the Gary Motor Corporation following the recent purchase of the company by Frank Dawson and his associates, has started work on a specially designed motor bus chassis and will add a light speed truck.

Officers and directors of the new organization are as follows: Frank Dawson, president and general manager; T. H. Cooper, secretary and treasurer; John Griffin, vice-president; and Harry Searle, director.

Recent price changes of models manufactured by the company are as follows:

Size Tons	Old Price	New Price
1-½ tonner	\$1,900	\$1,675
2 tonner	2,250	2,150
2½ tonner	2,750	2,550
3½ tonner	3,850	3,550
5 tonner	4,850	4,000

M. A. T. A. WILL HOLD ITS ANNUAL CONVENTION.

THE automotive tradesmen of Michigan will participate in the second annual convention of the Michigan Automotive Trade association at the Hotel Addison. It is expected that 500 motor car, truck, tractor and accessory dealers will attend. The two-day programme includes some of the most prominent executives in the automotive industry as speakers. The annual banquet will be held at the Hotel Tuller. Officers and five directors will be elected for the 1922-23 term and the plans of the organization for the coming year outlined at that time.

Michigan Buyers Must Get Clear Title

Used Car and Truck Owners Required by Law to Have Certification Papers.

LANSING, MICH., May 14.—According to Secretary of State, G. G. Deland, 200,000 truck and car owners must obtain certificates of title from the department of state between now and July 1. So far, about 342,000 owners have secured certificates.

Inasmuch as the new law provides that any person not having a certificate of title for a motor vehicle in his possession after July 1, will be guilty of a misdemeanor punishable by fine, the secretary of state is requesting motorists to hurry in with their applications. In order to get 200,000 certificates out to owners when the time limit is up, the department of state will have to work fast, and, unless the owners file their applications in plenty of time, there is going to be a lot of disappointed car owners, Mr. Deland believes.

Although the law provides that every vehicle owner must have a certificate after July 1, every person buying a used machine now is required to possess a certificate. The section of the law requiring dealers to transfer certificates of title to purchasers went into effect last October. All purchasers of used cars or trucks are required to forward the assigned title, furnished them by the dealer from whom they bought the car, to the secretary of state within ten days after the purchase, and apply for a new title for the vehicle.

M. T. McGoldrick and A. L. Sanderson have organized the McGoldrick-Sanderson Co., with salesroom at Spokane, for the distributing of Oldfield tires and tubes, Firestone truck tires and Sewell cushion wheels for trucks and day and night truck, tire and wheel service.

C. M. Addis has severed his connection with the New York Lubricating Oil Co., New York City, and is now vice-president of the National Lubricants Co., 135 Broadway, also of New York City.

George H. Hannum, president and general manager of the Oakland Motor Car Co., announces a new direct factory branch at San Francisco. The California Oakland Motor Car Co., which has been made a branch in San Francisco, was formerly simply a distributor of the Oakland Motor Car Co.

Edward Danner, former president of the insolvent Pan-American Motors, Decatur, Ill., and a receiver of the company, has been granted court permission to sell 30 cars inventoried at \$1,000 for \$630 each to the Woodbridge Co., Boston. The car was designed to sell to the trade for \$2,000. It is now a car without a home and receivers represented to the court that it is difficult to get buyers for a machine in this predicament.

Mammoth Industrial Center May Be Established Near Pontiac

Several Accessory, Automobile and Truck Plants Said to Favor Plan to Get Away from High Taxes in City of Detroit.
1000-Acre Plat Acquired.

DETROIT, May 12.—Establishment of a great industrial center near Pontiac, 26 miles north of Detroit, in which would be grouped several of the larger Detroit automobile and truck plants and accessory factories from all parts of the country, is seen here as a possibility following announcement by the Grand Trunk Railway that it is ready to lower the grade of its tracks along Dequindre street, from Jefferson avenue to Hale street, in Detroit, a distance of about 1½ miles, at a cost of \$4,000,000.

The great improvements, it is said here, will drive the opening wedge for what promises to be one of the largest railway improvement plans within recent years.

Officials of the railroad company, the Detroit Board of Commerce and certain motor hauling companies here have carried on discussions for the last year that included a plan for providing of an interurban line between this city and the proposed new industrial center so that Detroit workmen might have fast transportation to the point near Pontiac. It is declared decision as to expansion of the plan has been awaiting start on the Dequindre street project.

Due to high taxes certain automobile and truck companies here have expressed a desire to leave the corporate limits of the city of Detroit and remove to some other point. Local capitalists have acquired a 1000-acre tract near Pontiac as the site for a part of the new industrial project. It is said the work of moving one or more plants will be considered as soon as transportation facilities for the workmen are available.

Local financiers say that if the proposition becomes a reality the standing of southeastern Michigan as an automobile and truck manufacturing district would be enhanced because of the bringing of accessory plants into this part of the state.

The Grand Trunk is planning to erect a large terminal station here in the future and to make Detroit the center of east and west traffic on the system. Through traffic on the road now goes through the Port Huron-Sarnia tunnel. Completion of the new Windsor, Detroit bridge, actual work on which is to start this year, would make this possible, it was stated.

WHITE COMPANY HOLDS ANNUAL MEETING.

CLEVELAND, May 10.—The Annual Meeting of the stockholders of the White Motor Company was held at Cleveland, Ohio, May 6th. The Annual Report for

the fiscal year of 1921 was presented.

The stockholders re-elected as directors at the annual meeting of the White Company were: Windsor T. White, Walter C. White, Thomas H. White, Homer H. Johnson, Otto Miller, Warren S. Hayden, J. R. Nutt, and Wm. G. Mather of Cleveland; Walter C. Teagle and E. R. Tinker of New York City, and Philemon Dickinson of Philadelphia. R. W. Woodruff was elected to fill the vacancy caused by the death of A. R. Warner.

At the meeting of the newly elected board of directors, the following officers were re-elected: Windsor T. White, chairman; Walter C. White, president; Thomas H. White, vice-president; George H. Kelly, treasurer, and T. R. Dahl, sec-

300 MILES TO THE GALLON OF OIL.

SYRACUSE, N. Y., May 14.

—Three hundred miles by an automobile on a gallon of fuel costing 5½ cents is the claim of H. H. Elmer, treasurer and general manager of the Globe Malleable Iron and Steel Company of this city for an engine designed by himself, revealed to the directorate of the company at its annual meeting yesterday. Internationally known engineering experts, including Arthur West, chief engineer of the Bethlehem Steel Corporation, have inspected Mr. Elmer's engine and are said to have pronounced it hundreds of years ahead of time.

Three full sized models were tested before the directors today. One of the models, a one-cylinder, three-horse power engine, ran continuously for 18 hours on 1¼ pints of fuel, the directors stated. The fuel used is oil, either mineral, animal or vegetable. No ignition or caruretor is used. One model has attained a speed of from 2500 to 3000 revolutions a minute, the inventor claims.

retary. President W. C. White stated that in the month of April, 987 orders had been received compared with 640 for the same month last year, a 50 per cent increase, and that 855 trucks were delivered during the month, an increase of more than 20 per cent over the corresponding month last year. He further stated that the factory is rapidly increasing its production, 750 men having been employed since April 1st, making the total number of employes in the factory now more than 3,000.

If the present rate of sales is maintained, the company should do a business of approximately 9,000 trucks this year, upon which substantial earnings would be made.

The cash position continues to improve. There are only \$2,800,000 of notes payable, with no customers notes discounted, and cash of over \$2,500,000 and accounts of notes receivable of approximately \$6,000,000.

When asked concerning a rumored consolidation with another truck company, Mr. White said his only information was from a newspaper story and that there was absolutely no foundation for the rumor.

RAILWAY ASSOCIATION TO STANDARDIZE BUS.

NEW YORK, May 12.—Tentative plans for a standardized motor bus have been drawn up by the engineering committee of the American Electric Railway Association, the proposed dimensions of construction being as follows:

1. No. of passengers.... 21 25 29
2. Wheelbase (inches). 156 176 196
3. Engine (horsepower) 30 40 50
4. Tread, front and rear (inches)..... 66 66 66
5. Capacity of rear (tons) 2 2½ 3
6. Braking surface (sq. in.) 150 175 200
7. Approx. maximum weight (lb.)..... 4500 5000 5500
8. Low-hung type of chassis frame with a maximum frame height of 26 inches, preferably lower.
9. Spring suspension.
10. Engine preferably of either poppet or sleeve valve type with maximum speed not to exceed 1300 revolutions per minute.
11. Gear ratio not to be less than seven to one and not more than 12 to one.
12. Metal plate or spoke wheels.
13. 34-inch solid or semi-solid tires; pneumatics where low floor height not desired.

While no further plans are announced, it is understood that this step will be followed by further announcements in the nature of certain other chassis specifications, although nothing has yet been made public.

George K. Barton has become vice-president and sales manager, and also a director of the Universal Gasket & Mfg. Co., Cicero, Ill.

Crankcase Oil Dilution

THE following has been compiled from an article on Crankcase Oil Dilution, read by Wm. F. Parish at the April meeting of the Detroit section of the Society of Automotive Engineers. The subject has been carefully and thoroughly studied by this eminent authority, whose findings should be of interest to garage and service station operators, as it presents a clear and concise resume of a question that is rapidly assuming proportions of decided importance.

OIL, primarily, is for the purpose of keeping surfaces apart so that they will not strike. If the oil becomes so thin that the film interposed between the two surfaces is insufficient to prevent contact of those surfaces, local heating is immediately established where the striking takes place and the oil at that spot becomes suddenly thinner at the very moment when thicker oil is needed. As the oil becomes thinner through heat or dilution the locality where the striking occurs becomes more extensive in area and the wear is increased. In the automobile engine this wear may continue for some time as in the case of the wear of the cotton spindle, but eventually it causes a marked deterioration in the physique of the engine. Many of the ills of the engine can be traced directly to this wear. Among the common automobile engine ailments caused by this condition are oval cylinders caused by wear, worn piston rings, pumping of oil into the explosion chambers, loss of compression, the noisy operation of the engine and burning out of the bearings. In the last analysis engines show such great depreciation, largely because of the lack of lubricating properties in the mixtures they are forced to use as lubricants. Development of the Lubrication of Prime Movers.

It is of extreme importance to know the problems of lubrication that have influenced the development of all prime movers. In general problems of lubrication are the determining factors as to whether a type of machine shall exist or not. A machine that cannot be lubricated will not survive. The history of this development shows a long lane, strewn with the skeletons of discarded engines, once popular, but now obsolete, largely due to lubrication troubles. Types of machines that it has been possible to lubricate have survived and have been of the greatest use to our civilization. Types have improved to stages where they give no trouble and develop into prime necessities.

The Westinghouse crankcase steam engine, popular some 30 years ago, was lubricated by a mixture of water and oil placed in the crankcase. Due to leakages of condensation through the stuff-

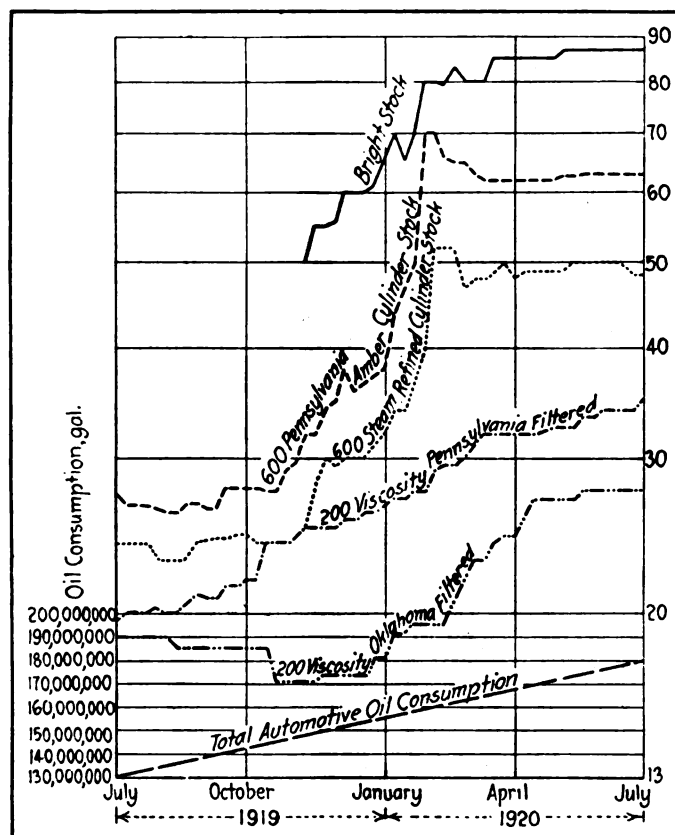
ing boxes and also to leakages of oil by the stuffing boxes and by the rings, the original mixtures were never constant; consequently much difficulty was experienced through the lubricating mixture "livering" up, with a consequent failure of the lubrication, burning out of bearings and repairs due to these causes. Eventually the type was discontinued.

The development of lubrication of the Diesel engine was along almost similar lines. In America the first Diesel engines were lubricated by the splash crankcase system. Water and oil were employed. The heat of the engine evaporated the water and the mixture then became too rich in oil with bad "ilvery" emulsions which, of course, failed to lubricate the bearings. The original American type of Diesel engine is now extinct.

Today, in the installation plan of a

33.33 per cent pressure and 23.15 per cent splash systems. However, fundamentally we are still lubricating the automobile engine, as in the original designs, with oil placed in the crankcase. In these systems, the oil circulates within the engine and carbon from the burned fuel and oil and dust and dirt from the road are retained by the oil. Particularly is this true of tractors. There are many instances in which tractor piston-rings and engine bearings have been destroyed in a few days due to dust acquired by the lubricant. In addition to this dust and dirt there are also the iron and metal particles, arising from the wear that has taken place. All of the foreign substances help to brake-down the oil and wear out the bearing surfaces. The mechanical development of the lubrication of the automotive type of in-

Figure Shows Manner in Which Demand Developed for Heavy Stock Oil During 1919-20, Showing Tendency of Truck and Car Owners to Use Full Bodied Lubricants.



modern Diesel engine, the coolers, heaters, filters, separation tanks and pumps make an installation by themselves. The lubrication of the original Diesel engine presented a serious problem. The modern Diesel operates most effectively on any number of good oils and the engine itself is one of the most efficient of all the prime-movers. The cost of its lubrication is small and the upkeep of parts which have to be lubricated is extremely little.

In considering the lubrication of the automotive engine it is interesting to note that we have developed from the 81 per cent splash systems and 19 per cent pressure systems in the cars of 1911 to the better proportion, in the 1920 cars, of 43.52 per cent splash-pressure,

ternal-combustion engine has not gone far beyond the original stages. In the meantime, the fuel has changed radically, and the fact has been established that the fuel finds its way into the crankcase and mixes with the oil, thus preventing lubrication.

It has been established that used oil, with the diluent removed and the dirt and carbon taken out, is as good a lubricant for the internal-combustion engine as new oil. Evidence has been presented to prove that oil is much better after it has once been used in an internal-combustion engine, then cleaned of foreign matter and the diluent removed, than when new. It is known that the use of oil that has passed through the engine, and been cleaned of diluent and dirt, will

produce less carbon with each successive recovery. This is an indication that the carbon-forming part of the oil is gradually burned out by the engine, and that the most carbon in the engine is produced by the newest oil.

Viscosity Limits of Oil for Lubrication.

The practice of lubrication engineering is based largely on experience. Certain definite rules have been laid down as the result of the experiences of many men who have worked on lubrication problems in all parts of the world. These rules establish limits in viscosity for various classes of work. For instance, the lightest and most rapidly running cotton spindle is lubricated with oils of between 54 and 70 viscosity Saybolt sec. at 100 deg. Fahr. Oils lower than the minimum limit cause wear and the blackening of the oil in the spindle base, and that establishes the limit for thinness. Heavier oil than the maximum causes heating of the spindle and loss of power and speed; thus the limit of thickness is obtained. Between these two points the lubrication of the spindle is perfect, but if these limits are exceeded detrimental action results. It is to be noted in this connection that the spindle will continue to turn and put twist in the yarn even though it may be undergoing excessive wear and consuming power exorbitantly.

In exceeding the limits of good lubrication practice, the changes that generally take place are too slight and too gradual to be noted immediately. Accumulated, they become of the greatest concern. The experienced lubrication engineer can define limits for the proper lubrication of every classification of machinery. In the case of the internal-combustion engine, however, the lowering volatility of the motor fuels during the last 10 years has introduced several variable factors which make it virtually impossible to standardize the limits of proper lubrication.

Engine tests with various oils indicate that the amount of carbon found on the pistons and in the engine corresponds very closely with the relative amount of carbon of the same oils shown in the laboratory with the Conradson residue test. It is further a matter of common knowledge that the use of heavy oils leaves the engines in worse condition as to carbon. The engines now have to be cleaned of carbon deposits at least every 4000 to 6000 miles, when formerly it was unusual to have this done under 15,000 miles.

Other difficulties encountered while using the heavier grades of oil are lowered mechanical efficiency and difficult starting, especially in cold weather, with heavy loads on the starting-motor causing rapid discharge and short life to the storage batteries.

Service Tests of Dilution.

An examination of the dilution conditions in nine trucks and cars conducted in Chicago in the winter of 1920 revealed the fact that after runs of under 100 miles the fuel in the lubricating oil amounted to from 15 to 41 per cent and that much of this dilution, in some cases as high as 22 per cent, occurred the first day.

The following winter a special series of tests was made on the engines of cars

and trucks equipped with either carburetor or manifold heating devices. One of these, a truck engine that was run the equivalent of 2 miles without going out of the garage, showed 1.5 per cent dilution. Later in service the distance was increased to 50 miles with a resulting dilution of 20.0 per cent and after a further 29.6 miles the dilution increased to 26.5 per cent. An air-cooled engine, run 2 weeks, showed 18-per cent dilution, while a roadster, run 524 miles in 1 week, showed 22-per cent dilution. A passenger car showed 20-per cent dilution after having run 576 miles in 3 weeks, while another of the same make and model showed a dilution of its lubricating oil of 31 per cent after having gone 668 miles in 3 weeks.

A medium-priced car, run 300 miles in 3 days, showed 14 per cent; another, after making 231 miles in 10 days showed 10-per cent dilution and a cheap car's lubricating oil was diluted 11 per cent after making 404 miles in 1 week. A sleeve-valve engine that operated 563 miles in 1 month, registered 47-per cent dilution.

Tests of tractor engines on the block, using gasoline of the grade sold in 1919, show dilution of from 8 to 15 per cent. Kerosene-burning tractor engines show dilution of from 30 to 50 per cent in 5 to 8 hours, using 1921 fuel. The question of dilution of the lubricating oil in tractors presents a far more serious problem than that of the passenger car or motor truck. This is because tractors are subjected to a more severe service and the burning of kerosene and the heavier distillates brings in additional complications.

However, from observations in various tests, it may be considered that dilution of lubricating oil in tractor engines operating on gasoline in cold weather amounts to between 20 and 50 per cent in several days. In the hottest weather, this dilution ranges between 10 and 30 per cent. With kerosene, the dilution runs between 30 and 70 per cent over a period of several days' operation, the per cent of dilution depending upon the original amount.

Effect of Diluted Oil on Engine Friction.

Approximately one-quarter of the engine friction is due to the bearings and the auxiliaries, the other three-quarters being caused by the piston-rings rubbing on the cylinders. Reducing the viscosity of a heavy oil by mixing kerosene with it will reduce the power required to overcome the friction in the main bearings, until the reduction in the viscosity reaches a point where the surfaces strike. Then there is a rapid increase in frictional power as the striking area becomes larger. Reducing the viscosity of a heavy oil with kerosene for the lubrication of the cylinders will not bring about a reduction of the frictional horsepower to the same degree as with the lubrication of the bearings, because the heat of the cylinder-walls will throw off some of the diluent at that point; consequently the diluted oil on the cylinder will be thicker and produce more resistance than the same oil in the crankcase.

An extremely interesting phase of the engine oil situation has been created by

the dilution problem. The motoring public have, apparently, been the judges as to what their engines required, as evidence will be presented showing that quantities of the various grades of oils actually purchased have not balanced with the charts of recommendations that represent the seller's idea of what should be sold. The oil companies enjoying the bulk of the automotive oil business have steadily increased the viscosity of their brands.

The unprecedented and unlooked for demand on the part of the public for heavier engine oils greatly upset the oil market for the heavier stocks from which the heavy oils are made. The bright, filtered stock, the most expensive of the stock oils increased very rapidly in price as the extraordinary demands were made upon it. This shortage of the bright stock oil was reflected in the rapid increase in the sale and advance in price of the cheaper filtered cylinder stocks, and finally of the dark unfiltered stocks, which were substituted by a number of manufacturers for the brighter oils with the result that their finished engine oils were black. It is a matter of trade knowledge that every national marketer of automotive lubricants was unprepared for the high and overbalanced demands made by the public for heavy engine-oils during the 1920 season. The figure shows the way in which the demand developed with the result on the heavy-stock oil market. The advertisements of at least one large oil company during 1921 gave many arguments for not using heavier oil, and can be taken as evidence that there was an attempt being made to counteract the tendency of the public to purchase heavier oils.

Temperature of Oil in the Crankcase.

The viscosity of all oils is reduced as the temperature increases. At a temperature of 150 deg. Fahr. in the crankcase, the light, medium and heavy oils will all be of different viscosities. If the light oil can then be made to operate at a temperature of 130 deg. Fahr., it will have slightly more viscosity than the medium oil at 150 deg. If the temperature can be lowered to 120 deg., the viscosity of the light oil will be equal to the viscosity of the heavy oil at 150 deg. Fahr. It is possible, therefore, to have the equivalent of a heavy oil in the engine by using a light oil and controlling the temperature.

The viscosity of a diluted light-oil may be the same as the viscosity of the undiluted light-oil but heated to a high temperature. It is, therefore, necessary, after heating the oil and fuel mixture to remove the diluent, again to reduce the temperature of the clean oil to a point at least the same as the temperature at which it is taken out of the crankcase.

Lubrication engineers agree that it is desirable to use the lightest oil that will consistently keep the surfaces apart at working temperatures. The success of internal-combustion engine lubrication with lighter oils was established some years ago, the limits being determined by careful work at a time when there was practically no dilution. With the advent of the dilution problem, it was no longer possible to work within such fine limits.

Raskob Talks on Transportation

THE FOLLOWING is compiled from a speech made by John J. Raskob, chairman of the finance committee of the General Motors Corporation and vice-president of E. I. Du Pont de Nemours &

Company, before the state highway commissioners at a dinner given at the Du Pont Hotel, Wilmington, Delaware. It is especially interesting as a prophecy of the future of transportation.

"UNTIL that time arrives in the progress of civilization when a man admits that he can do no more, there will be use for every mechanical appliance which annihilates time, space and distance.

"There have never been enough Pullmans so that every traveller could have a "lower." There have never been sufficient freight cars to carry the crops to market, nor the raw materials from our mines, nor the finished products from our factories.

"When airplanes blacken the sky carrying freight and passengers across land and sea—and, relatively, that day is not far hence—there will be no apparent diminution in the use of existing transportation facilities.

"From the day the first New York subway demonstrated its feasibility, engineers have been busy building new ones, extending old ones and planning future ones. There is no decrease in the travel upon the old lines of transit, yet our city streets and country roads are black with motor cars swiftly carrying passengers and freight where formerly were only slow moving horse-drawn vehicles.

The telephone, telegraph, and ocean cables have never been able to handle the traffic thrust upon them. As new facilities are created much business, handled by mail, is transferred to the wires. The radio and the wireless have not lifted the burden from the cables.

"Telephone engineers project their curves of the future of telephony and tell us that the telephone is yet in its infancy.

"There are 13 million telephones in use in this country—a surprisingly small number. Every day there are made an average of 36 million telephone calls—the staggering total of 13 billion calls annually. As great as that total may seem, that is approximately but one call every three days for each man, woman and child in this country. Yet, you ask any business man how many times his 'phone rings and he will tell you once a second.

"Let's compare these totals with the motor car, another mechanism, which has taken its rank along with other indispensable utilities, for it is the subject of good roads which has brought us together tonight; and if it were not for the motor car there would be no good roads.

"There are, according to the U. S. Bureau of Public Roads, 10,448,000 passenger and commercial cars in use in this country. For purposes of our calculations let us take an even 10 million.

"If each car carries an average of but 2 people (most of them can carry five) and operates but 300 days a year (most of them could operate 365 days a year) the equivalent of 6,000,000,000 passengers are

carried each year. In addition, according to the National Automobile Chamber of Commerce, 1,200,000 tons of freight are carried by the motor trucks. This is four to six times the number of passengers carried by all the steam railroads in the U. S. and about half the amount of freight hauled by the railroads.

Annual Car and Truck Mileage Totals 60,000,000,000.

"The National Automobile Chamber of Commerce has made a survey and ascertained that the average travel of the passenger cars is 6,400 miles annually. That would mean approximately 60,000,000,000 miles travelled yearly by all the passenger automobiles in this country, which is about 164,000,000 miles a day. The Chamber is authority for the statement that 90 per cent of all automobiles are used more or less for business purposes. Further, that 55 per cent of the total number of automobiles in the U. S. are owned by people living in communities of 5,000 inhabitants or less. Also, that one-third of all passenger cars and one-sixth of all motor trucks are owned by farmers. Contrary to popular opinion, these facts show that the automobile is more generally used in the country and small towns than in the city. They further emphasize the great need of a network of good roads covering all parts of the United States.

"The U. S. Bureau of Mines says that the 1921 consumption of gasoline in this country was four and one-half billion gallons. According to the highest authorities in the petroleum industry, 4 billion gallons, or 90 per cent is used for operating motor vehicles.

"Let us endeavor to parallel the telephone figures with those of the automobile.

"The telephone is generally conceded to be one of the essential tools of modern civilization, which is absolutely indispensable to man in his hours of business as well as recreations. Few civilized men live in such isolated solitude that they are beyond the reach of the telephone.

"In this country there is one telephone to every 8 persons. There is one motor car for every 11 persons. There are 3 calls daily on every telephone. The average motor car travels 21 miles daily. Every time a telephone rings there is a motor car somewhere in this country which has travelled 7 miles performing some useful function.

"Here we have statistics demonstrating the constant and universal use of two mechanisms, each in its own sphere, performing an indispensable function in the every day life of millions of people. Their wide-spread use is based purely upon their utility value. No other reason would be a satisfactory explanation of

this phenomenon.

Automobile Overcomes Obstacles of Time and Distance.

"Individually we can multiply our personality by the writing of letters, by the use of the telephone, telegraph and cable. Occasions frequently arise when these methods of communication will not answer. Our physical bodies must be transported quickly from one place to another. The automobile is the only effective means of always having at our disposal the power thus to overcome the obstacles of time and distance.

"When Morse invented his telegraph and Bell his telephone, man had long before learned to draw fine wire, else these two inventions would have been useless. The railroad train would be merely an interesting mechanical curiosity to exhibit in the Smithsonian Institute, if man had never found a way to make tracks for it to run upon.

"The automobile was born into a roadless world. Compared with the millions of miles of telephone wires and the thousands of miles of steel rails, which make these other two great inventions effective, the automobile is still in a roadless world. The automobile was the creation of brains which dreamt of thousands of miles of boulevards where once existed mudholes and ruts. Once more, by comparison, we have only commenced to cover up those mud holes and ruts. Yet, a goods roads movement, which promises incalculable benefits to mankind, is well under way. In this movement the automobile has been the most powerful missionary, emphasizing, as nothing else has done, the universal advantages to be derived from adequate highways. I am going to leave the telling of what has been accomplished in the building of good roads to some of you gentlemen here present who are competent to speak with authority upon that subject.

"But you will say there must be some limit to the utility of inventions such as telephones, telegraph, wireless, railroads, subways, automobiles, etc. Of course there is a limit since only God, time and space are infinite.

"The answer to our question must lie along this line of thought: There was no need for the telephone until its use was general. We had been content with the messenger who delivered by hand our written notes.

"Before there were subways there were elevated trains, and before there were elevated trains there were street cars, and if we go back far enough there were horse drawn bus lines.

"Our grandfathers were content to ship their freight by canal boats or haul it over land. They, themselves, were happy to travel by stage coach or on horseback.

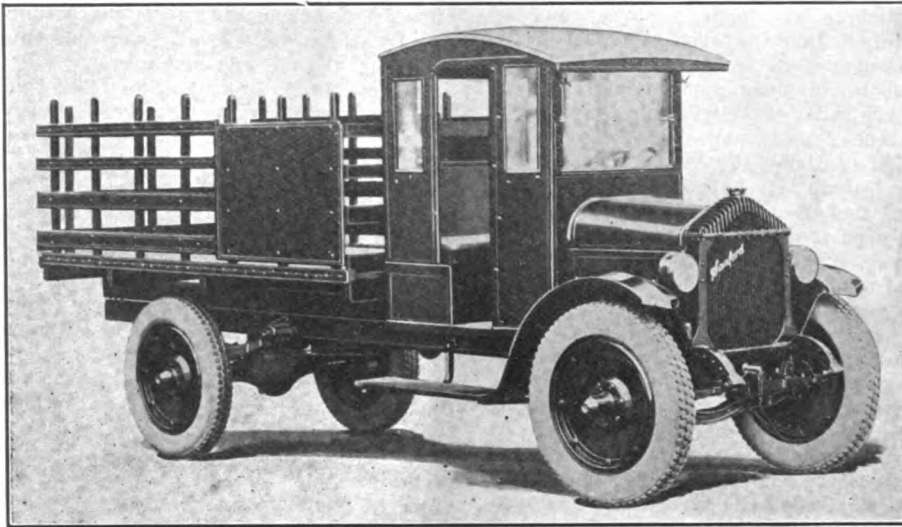
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LIGHT TRUCK MOVES APARTMENT HOUSE

TO MOVE an entire apartment building, three stories high, in one small Chevrolet truck, might seem a feat bordering on the miraculous, but it was practically accomplished by the Ledger Publishing Company, Columbiana, O. The moving was done before the building was completed, and carried out a little at a time. In other words, the building was carried piecemeal from the various supply houses furnishing building material; the truck took on everything — sills, lintels, concrete blocks, lumber, bricks, cement, sand and gravel — carried it to the proper place, and went back for more.

R. J. JEFFREYS, president of publishing house, was an old-time driver of racing cars on the dirt tracks, and he admits that he "pushed the Chevrolet over the roads pretty lively." He adds, frankly: "I have put a number of cars through the mill and anyone knows through here that if a car stands up under my driving it is a good one. So far as the Chevrolet truck is concerned, I could cite hundreds of examples and instances of unique and exceptional stunts that this car has performed, but suffice it to say that it has made a name for itself in this country that commends it to all prospective purchasers."

SANFORD 1½ TONER



Strength and Speed Are Sanford Light Truck Features.

(Continued from Preceding Page.)

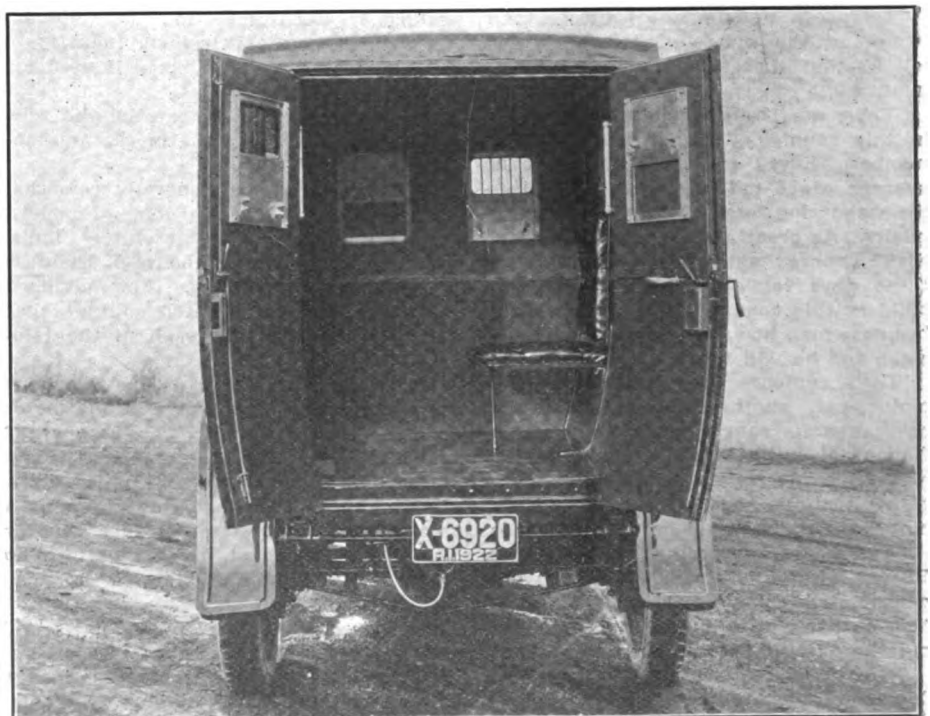
In turn, our grandchildren will smile when they read that of which we boast so fondly today.

"There may be a physical limitation and a mental limitation and a limitation of time so far as the activities of the man of today are concerned. But who will admit to himself that the limit of his individual ability or capacity has been reached? Since transportation is fundamental to man's activity there will ever be use for more transportation and better transportation because each new mechanical appliance or invention opens up realms of activity for mankind which never existed before. Until the time arrives in the progress of civilization that man admits that he can do no more there will be use for every mechanical appliance which annihilates time, space and distance."

THE new Sanford supplements the well known line of Sanford heavy duty trucks of 2½, 3½ and 5-ton capacities. It is specially designed to meet the needs of conservative buyers who seek speed and strength, yet whose load requirements do not call for the strictly heavy duty trucks.

The Sanford model W-15 is the result of sixteen years engineering and sales experience. It embodies the best Sanford features of dependability and reliability under adverse load and road conditions. Safety of goods in transit has been a prime consideration in its production. Improved methods of construction and an intimate understanding of the present day needs of a very large class of buyers has resulted in a light, flexible and easily handled truck, capable of performing satisfactorily under more than ordinary hard usage.

PAYROLL CARRIER



Burglar Proof Body Built by Providence (R. I.) Body Company.

THE MOTOR BUS FIELD

A DEPARTMENT DEVOTED TO THE
INTERESTS OF MAKER AND USER

MANUFACTURE — DISTRIBUTION — OPERATION — DEVELOPMENT — NEWS

Shortline Railway Convention Approves White Rail Car

*Newly Developed Vehicle Making Daily Demonstration
Runs During Course of Meetings Wins Praise
of Steam Road Representatives.*

RAILROAD officials, having become much interested of late in the gasoline propelled railway car, were given the opportunity a few days ago of inspecting the White rail coach, which was run over the Pennsylvania railroad from Philadelphia to Washington, a distance of 136 miles. The car made the run

to Washington for the annual meeting of the American Shortline Railroad Association and was a feature exhibit at the convention. It made daily runs during the convention over the tracks of the Washington & Old Dominion Railway, carrying as passengers representatives of the various short line railroads in attendance.

WHILE a number of shortline railroads have been operating gasoline rail cars successfully for several years, it is only recently that the gasoline car has come to attract wide attention on the part of railroad men, not only operators of shortline railroads, but officials of some of the country's largest transportation systems.

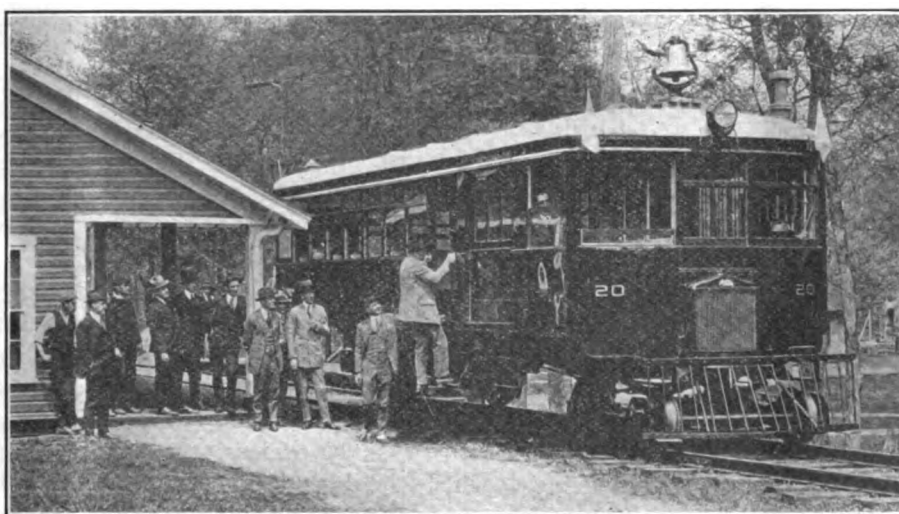
Developments in the rail coach are being watched with the keenest interest by railroads and the run from Philadelphia to Washington attracted numerous

prominent Pennsylvania railway officials as passengers. Among the Pennsylvania executives who made the trip were: J. E. Burrell, superintendent passenger transportation, eastern region; F. K.

Fildes, foreman mechanical engineers office, eastern region; J. M. Jones, passenger trainmaster, Philadelphia terminal division; H. K. LeSure, chief electrician, eastern region; H. H. Haupt, assistant engi-

O'Toole, office general superintendent, Southern division; Harry Babcock, passenger trainmaster, Maryland division; Edward E. Hess, trainmaster, Baltimore division; and C. E. Wann, assistant trainmaster, Baltimore division.

Other railway officials on the car were: Senator George L. Shinn, president of the Union Transportation Company, for New Egypt, N. J.; Fred Johnson, superintendent the Union Transportation Company; and W. W. Wilson, general manager the Lewisburg, Mil-



White Rail Bus Specially Designed for Passenger Service.

neer motive power eastern region; J. Stair, Jr., general electrician, New Jersey division; E. S. Stewart, advertising agent Pennsylvania system; James Buckelew, superintendent Maryland division; Timothy

ton & Watson town Passenger Railway Company, of Milton, Pa. Representatives of the White Company, Cleveland, and the J. G. Brill Company, Philadelphia, made up the remainder of the pas-

senger list.

The rail car driven to Washington was built for the Union Transportation Company and is now operating over the company's 25 miles of track, between Pemberton and Hightstown, N. J. The Uniontown Transportation Company placed a 29-passenger rail car in service several months ago and its operation proved so successful that a second car of larger capacity was purchased.

The larger car — the one used on the demonstration run — has a seating capacity of 41 and a baggage compartment directly in the rear of the driver, who controls the car from the right-hand side. The body, which is of semi-steel construction, is mounted on a specially designed White Rail car chassis. There is a four-wheel pivotal truck in front and two wheels in rear. It is governed to a speed of 33 miles per hour. This speed was maintained with ease on the run to Washington. The satisfactory performance of the car, both on the runs over the Pennsylvania and over the Washington & Old Dominion Railroads from Washington to Great Falls, Va., much impressed the railroad men, who were given the opportunity of viewing its operation at close range.

The trips over the Great Falls division of the Washington & Old Dominion Railroads were considered a severe test for the car as the road is a succession of grades and curves, the grades running as high as $3\frac{1}{2}$ to 4 per cent and the curves to 10 degrees, with a frequent combination of both grade and curve. The grades were negotiated with ease and a fair speed was maintained even on the most severe ascents. To demonstrate its reserve power the car, on numerous occasions, was brought to a stop when midway up a grade and again started. It accelerated readily and continued to the tops of grades without difficulty. This was true in both forward and reverse speeds. Refinements embodied in the latest type of rail car makes riding exceedingly comfortable. It has been the experience of the Union Transportation Company that passengers

prefer riding in their gasoline rail car to their steam trains.

As previously stated, railroads are watching with keen interest devel-

RED SCHOOL HOUSE PASSING.

NOTHING illustrates the passing of the isolated sections of this country better than some figures recently presented at a meeting of the Chamber of Commerce of the State of New York. The district school house use to be the educational and social center of agricultural communities; it and the church were formerly the only public places at which gatherings could be held.

"The automobile has played its part in causing the 'little red school house' to lose its importance," says Guy H. Peasley. Sales



Interior of White Rail Coach.

Manager of the Olds Motor Works. When the Chamber of Commerce of New York met recently, Chancellor Lord gave the members some statistics on attendance at the single room schools of the state. In fifteen schools, the average attendance was one; in 167 schools, the average attendance was three; in 397 schools, the average attendance was 5; and in 3000 schools, average attendance was 10 or less.

"The one-teacher school is admittedly unsatisfactory particularly where the teacher, owing to low pay and the high cost of living, may not be of much ability. There are still many capable and wonderful men and women in this work, but the tendency of the times is away from one-room schoolhouses.

Improvements in the gasoline rail car, recognizing that equipment of this type offers an opportunity of serving the traveling public at a cost far below steam train operation.

Railroad men are pretty well agreed that the expensive part of the railroad business is the running of thousands of miles of unprofitable passenger service on light branches of light portions of main lines where the people demand service. Once established, it is a difficult thing for the railroads to curtail service, even though it be unprofitable.

With recent improvements in the rail car before them, railway executives are alive to the situation and are now genuinely interested in the possibilities of rail cars as a solution to the problem of being forced to operate passenger trains where business does not justify doing so. They are convinced that rail cars, because of the light weight and low first cost, coupled with simplicity in operation and maintenance, are worthy of serious consideration.

R. P. HENDERSON RESIGNS VICE PRESIDENCY.

Announcement has been made of the resignation of R. P. Henderson from the vice presidency of the Martin-Parry Corporation, commercial truck and bus body manufacturer at York, Pa.

In 1916 Mr. Henderson severed his connections with the Cole Motor Car Company to become associated with the Parry Manufacturing Company at Indianapolis, who soon became known as the largest producers of standardized commercial bodies in the country.

By 1918 their success attracted the attention of eastern capitalists to the importance of commercial bodies as offering an independent and profitable line of production. As a result the Parry plant at Indianapolis and the Martin plant at York were taken over and operated under the name of Martin-Parry Corporation with Mr. Henderson as vice president, in charge of sales.

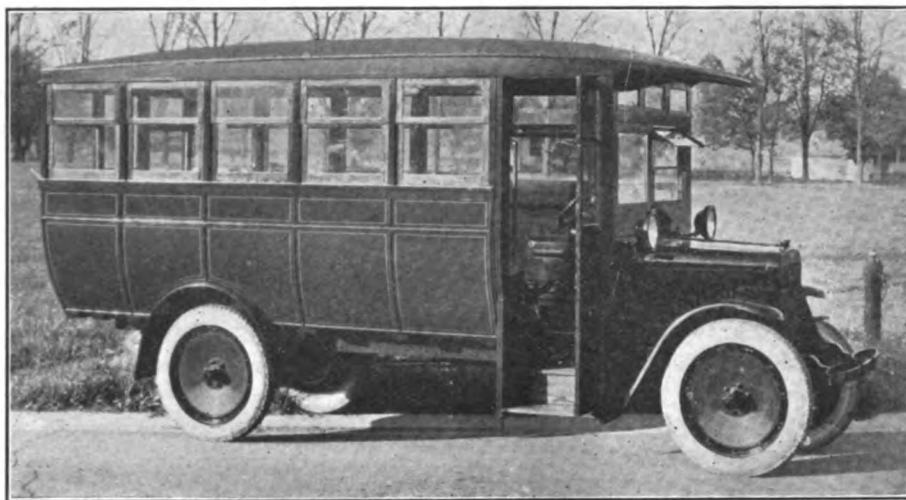
He was formerly a director of the Cole Motor Car Company.

RED PYRAMID BUS ECONOMICAL

THE body of this Service bus, mounted on a Red Pyramid Speed Truck Model 5, is of conventional design, fitted with windows to raise, pay-as-you-enter entrance opposite the driver, emergency rear doors, rattan covered seats with spring bottoms and backs, and ample space between seats to allow adequate knee room. Five passengers may be seated across the rear end and six passengers on the left hand side face forward, while the other six face inward.

The bus is lighted by electric dome lights of sufficient capacity to permit reading. A fully upholstered bucket type, independent seat is provided for the driver.

Provision is made for the application of a fare register, and for a route card in the upper right hand front corner of the body. This card may be inclosed and illuminated. Due to the special spring suspen-



This Bus Can Be Operated at a Cost of 16 to 19 Cents a Mile.

sion of this truck, which means the truck itself is suspended on three points, this bus is exceptionally easy riding and glides along smoothly and quietly, which we believe is one of the determining factors in influencing the popularity of busses.

This outfit complete, as shown, including depreciation, driver's hire, maintenance, overhead, insurance, taxes and all legitimate charges, under competent management, can be operated for from 16 to 19 cents per car-mile.

GMC ANNOUNCES 20 PASSENGER BUS

EMBODYING several new features particularly designed and fitted to motorbus work, together with many other distinctively GMC points of superiority, the GMC 20 passenger motorbus, just announced by the General Motors Truck Company, offers another fine unit of transportation in the bus field.

BY COMBINING a long wheelbase with exceptionally long and flexible semi elliptic springs perfect riding qualities have been given the chassis. The body, which is extremely roomy for its capacity, overhangs the frame but slightly. Bouncing, sidesway and whipping is overcome by the long wheelbase and the fact that the frame overhangs the rear axle only a few inches.

The power plant is more than ample for a road speed of 30 miles an hour to which the bus is governed and, also to furnish pulling power for bad grades and unimproved roads. The power plant is of GMC design and manufacture and

embodies all of the distinctive GMC features of construction.

The bus body for this new equipment is furnished with two seating arrangements, one adapted particularly to interurban bus operation and the other designed for city passenger work. The interior of the bus is finished in paneled oak with rattan seats. It is complete in every detail, including non-rattling adjustable windows, complete buzzer signal system, front entrance door, controlled from driver's seat and rear emergency door. Special attention has been paid to the front

door design. The step is low and broad, making it particularly safe against accidents.

The bus rides on 36 x 6 cord tires, all around. One other new provision, which is of special GMC design, is the fuel tank, located outside, and filled from there without inconvenience or fire risk. A vacuum system carries the fuel to the engine.

In addition to the two styles of body, the bus chassis will be sold alone in cases where special body equipment is demanded.

DESIGNS BUS CHASSIS.

A motor bus chassis has been completed by the Masters Motors Incorporated of Chicago. This chassis has interesting new features which recommend it to many prospective purchasers. A low center of gravity is secured by undersliding the springs and offsetting the frame in a decided manner over the rear axle.

Outriggers are fitted to the frame to which the body is securely fastened, overhanging only one inch.

THIRTY-SIX RAILWAYS OPERATE BUSES.

THERE are 36 electric traction companies now operating busses. These are located in various sections of the United States including Boston, Mass., Bakersfield, Cal., Minneapolis, Minn., and Fort Worth, Texas.

Transport Line Embraces Six Models

Units Classified to Provide Range of Service Covering Entire Trucking Field—Light Delivery Hauls Ton at Speed of 35 Miles an Hour.

A MARKED characteristic of Transport's 1922 line is its completeness. There is a model classified for every service, as evidenced in the 2,000, 3,000 4,000, 6,000, 7,000 and 10,000-pound maximum capacities. The buyer of a Transport Truck can select a model just suited to his average loads. No investment in capacity or excessive and unnecessary cost of upkeep are entailed.

throughout are reflected in the performance of the Rapid Transport.

The Continental N 4 cylinder engine is used in this model. Rear axel is bevel gear type, with massive nickel steel ring gear and pinion. Driving axles are of nickel steel alloy and uncommonly strong and durable. Transmission is designed and built specially for fast 2,000-pound Transportation.

Fabric universal joints are used,

heavier duty than the Rapid Transport and offers everything desirable for service in its capacity class. It is powered by the Buda WU.

Easily capable of 30 miles an hour under full load, extremely short turning radius and general flexibility particularly fit this model for quick work in narrow streets, alleys and other places difficult of access. It is well suited for use by the farmer in lanes, woods and orchards, while exceptional power and lightness in weight make it thoroughly practical for use in the field.

Comfort and convenience are provided in the large, roomy cushions, complete electric light equipment and accessibility.

Model 35—4000 Pounds Maximum, \$1885.

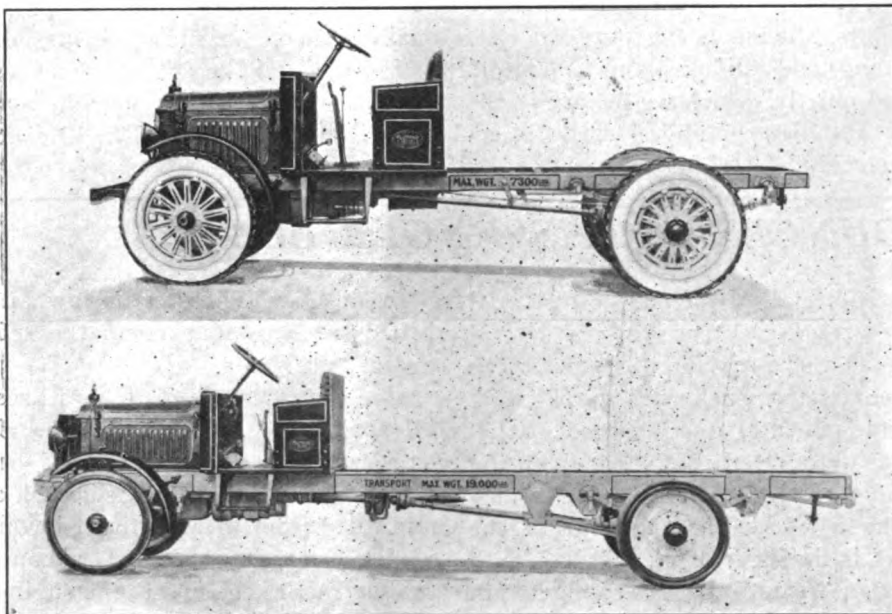
Model 35 fits a well-defined need in motor transportation. It is especially designed for 4,000-pound maximum loads, which have, in the past, sometimes been taken care of by overloading lighter models or underloading those of heavier capacity. Every unit and every piece of material entering into the construction of this truck is particularly adapted to 4,000-pound service. Continental power plant is used.

It meets the requirements of bus service, as the long wheelbase permits the mounting of a commodious body. This truck is also adapted to many phases of farm transportation. Ample space of chassis frame permits the use of any type body required — for hauling stock, hay, grain, feed and all kinds of produce.

The four-speed transmission makes possible the installation of an engine which effects a substantial saving in operation expense, yet providing ample power to haul full-capacity load. The road speed is 25 miles an hour.

Model 55 and Model 60.

In general design and construc-



Upper—Model 25. This Substantial Member of the Transport Line Has Capacity of 3000 Pounds. Lower—Model 75, with Maximum Capacity of 10,000 Pounds.

THE Rapid Transport registers a distinct advance in the field of light, fast transportation. It travels 35 miles an hour, loaded to capacity, without taxing any part of the mechanism. And combined with the qualities of speed, flexibility and operating economy is a sturdiness of construction that assures steady, reliable performance and service-life equaling the heavier capacity of trucks.

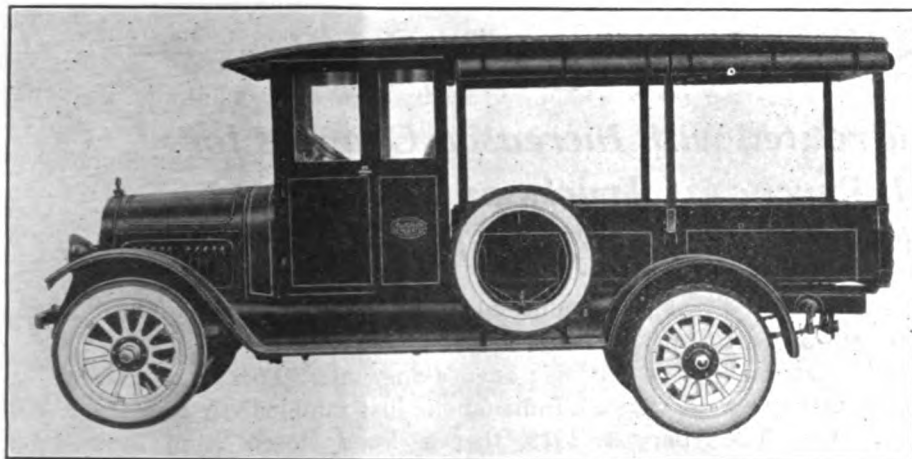
It is designed for retail and wholesale store delivery — for farm hauling — for every kind of 2,000-pound transportation. Transport balanced construction, Transport quality

with Snead shafts. This joint requires no lubrication and is easily serviced. It absorbs severe shocks, occasioned by sudden driving strains, likewise protects engine from road shocks delivered to rear wheels. The Snead shaft, though light, is unusually strong and there is absolutely no whipping.

This model is regularly equipped with pneumatic tires, electric lights, starter, electric horn, windshield, seat, running boards, fenders, speedometer, jack and tool kit.

Model 25 — 3000-Pound Maximum.

Transport model 25, 3000-pound maximum, is designed for somewhat



Rapid Transit—A Speedy Delivery Car with Maximum Capacity of 2000 Pounds.

tion, models 55 and 60, for 6,000 and 7,000-pound maximum loads respectively, are similar. Engine and rear axle in the larger model are, however, designed for the more severe service to which this truck is subjected. Both of them have slow-speed, heavy-duty motors with armored radiator of sufficient size and proper construction to insure perfect cooling. The model 60 Buda HTU engine has extra large crank shaft, cam shaft and bearings and is designed throughout for heavier service. The one used in model 55 is Continental C-2.

Engines have full force feed lubrication systems. Oil pumps are driven by gears off cam shafts and are, therefore, positive in action, forcing oil through drilled crank shafts to all bearings. Thorough lubrication is thus insured.

Four-speed transmissions enable engines to furnish ample power to handle full-capacity loads under all trucking conditions. Frames are of heavy stock with deep side members and wide flanges. They are inswept between front wheels to permit small turning radius.

Model 60 is designated as the Contractor's Special because of its capacity to meet the very trying service tests demanded in this class of work.

Model 75 — 10,000-Pound Maximum.

Model 75 for heavy duty is a notable Transport development. Buda YTU 4-cylinder engine is used — a power plant equal to any emergency demanded in 10,000-pound maximum hauling. Has removable

head. Gas is superheated by exhaust manifold before drawn into motor, insuring perfect combustion.

Transmission has four speeds forward. All gears are $3\frac{1}{2}$ per cent nickel steel, 1-inch face and are constantly in mesh. Changing from one speed to another is accomplished by engaging large, heavy clutches, thus preventing raking of gears and enabling the operator to shift easily from high, or fourth gear, to any one desired as occasion requires. The superiority of this transmission for 5-ton service is universally recognized.

Rear axle is of the internal gear drive type, same general design as used on models 25, 35, 55, and 60, except that it is larger, stronger and built in every way for 10,000-

pound maximum service. This axle applies 92 per cent of the developed engine power at the point of greatest leverage — near the rim of both driving wheels, thus assuring best results with least waste of energy. Entire weight of chassis, body and load is carried on large, one-piece nickel steel axle.

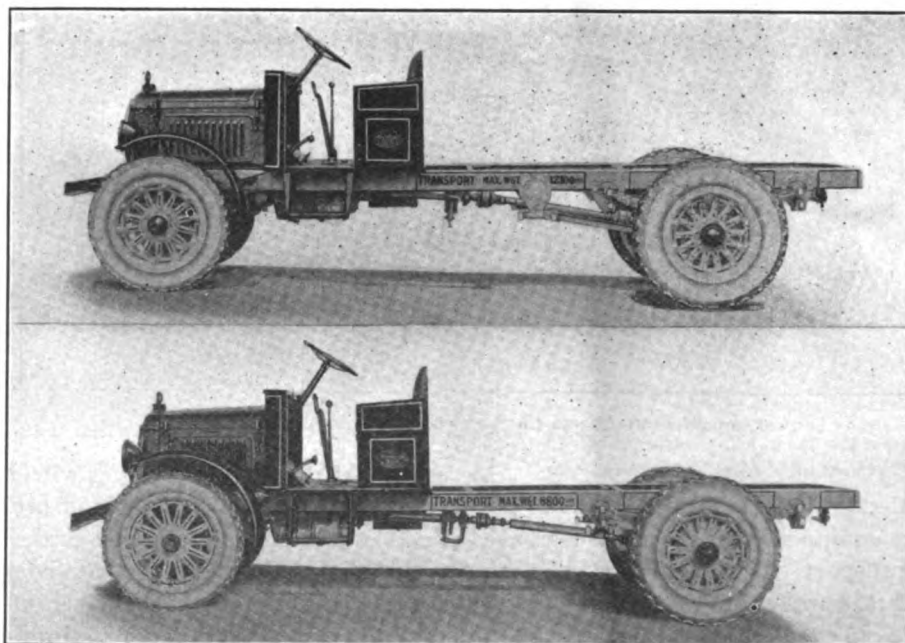
Model 75 has a 12 inch road clearance, which is ample to keep differential housing from dragging and to enable truck to travel anywhere an automotive vehicle can be operated. This model is regularly equipped with cast steel wheels, which completely eliminate all wheel trouble due to roads, loads, climate or other causes.

The mammoth loads this truck is called on to handle are carried on long, wide, resilient springs. The spring suspension is ideal. Nickel steel spring and shackle bolts are used throughout the entire construction, with thorough oiling provided by well and wick system. Model 75 shows marked efficiency in the lumber and logging industry, in the oil producing fields, transfer and storage business and all work calling for heavy hauling.

Other Special Features.

Chassis lubrication on all Transport models is taken care of by the Alemite system with well and wick oiling for spring and radius rod

(Continued on Bottom of Next Page.)



Upper—This Picture Shows Model 55, a Transport Truck Having a Capacity of 6000 Pounds. Lower—Model 35, with Maximum Capacity of 4000 Pounds.

Trucks Solve Haulage Problem

Indianapolis, Confronted with Increased Charges for Ash Removal, Purchases Trucks and Trailers and Averts Spending of Extra Money

MOST traversed of all paths are the two famous ones popularly referred to as "the path of least resistance" and "the straight and narrow." Like the treadmill of old, the first of these paths is a place to walk and walk without ever arriving. The pedestrians who arrive invariably cut across to the "straight and narrow." All of which is preliminary to a narration of what happened when the city of India-

napolis launched forth on a pilgrimage, figuratively speaking.

Setting out along the "path of least resistance", Indianapolis just rambled. It was about January 1, 1919, that a "road closed" sign loomed up, forced the Hoosier Capitol to deviate from the chosen path — and, "we'll never return." officials who guided the city out of the wilderness aver.

ON OCT. 1, 1918, the contract for hauling Indianapolis' ashes expired. The contract had been held by the Indianapolis Hauling Company, which submitted a new bid. Beginning January 1, 1919, it would be worth \$84,000 a year and \$54 an acre for annexed territory to continue the ash-hauling work for a period of five years.

That was the straw that broke the camel's back. The city immediately cast about for a new beast of burden. The result was the purchase of four 5-ton White trucks and 25 trailers. This fleet went to work immediately. That was in the winter of 1918-19. Since that time, the

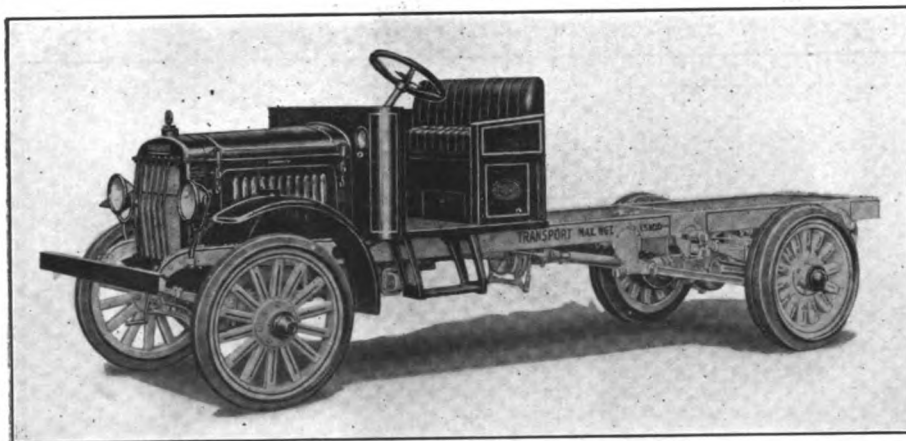
motor equipment has gone faithfully along writing itself off the books. During 1919, a total of 115,286 cubic yards of material was collected and hauled to the dumps, and the amount hauled in 1920 and 1921 closely approached this figure.

Figuring seven years as the life of the trucks and trailers, the item of depreciation for 1919 was approximately \$8,286. Operating costs (including oil, gasoline, tires, repair parts, labor on trucks and trailers) totaled \$12,305. Allowance of 6 per cent interest on the balance of the cost of the equipment adds \$2,784 to the year's total. Then throwing in a pay roll of \$53,063, the total cost for

1919 amounts to \$76,439 which, on the basis of 115,286 cubic yards of ashes collected, gives approximately 66½ cents as the haulage cost per cubic yard.

Advantages of Motor Truck.

But the real advantage of the motorized and city-controlled ash hauling system is not at once apparent in these figures. Recall that the renewal term proffered by the private contractors was not a flat figure of \$84,000 but rather that amount plus \$54 an acre for annexed territory. Since taking over its own ash-hauling job, the City of Indianapolis has extended its service facilities to a greatly enlarged territory which,



Transport Model 60 for 7000-Pound Maximum Load.

(Continued from Preceding Page.)

bolts. Models 35, 55, 60, and 75 are equipped with specially designed Transport double-action drive shaft service brake, which applies pressure equally to both rear wheels and checks the tendency to skid, when turning a corner by proper

control of the faster traveling wheel. A spring cushion on brake rod prevents grabbing action when brakes are suddenly applied. Brake shoes set up slowly, giving a positive, but smooth, velvety action. This brake construction is an exclusive Transport feature.

Radius rod equipment on models 35, 55, 60 and 75 make it impossible for rear axle to slip on springs, assuring perfect operation of braking mechanism under all conditions. By holding rear axle in perfect alignment with frame, the possibility of undue wear on tires and strain on bearings is also eliminated.

Electric lights, bumper, hubometer, motometer, radiator guards, jack and tool kit are part of the equipment that is regular throughout the line. Rapid Transport is equipped with starter.

Transport's 1922 line reflects in every phase of design and construction the high ideals which have been maintained by this company from the very beginning. The specifications tell a story of truck values which establish new standards in motor truck transportation.

had it been annexed under the terms of the tentative new private contract, would have run the expense of that service very close to \$100,000. **City Owns and Controls Equipment.**

Moreover, the city now owns its own equipment and controls its use. Whereas, formerly, some sections of the city were neglected at times when the weather was inclement and complaints were accordingly vociferous and vexing, calls and collections are now made regularly, in fair weather and foul, and complaints have, consequently, been reduced to a negligible number, according to Mr. Thomas A. Riley, supervisor of Indianapolis' Ash-Hauling Department.

Few Complaints Now.

"We used to have to listen to as high as 200 complaints a day," declared Mr. Riley. "Now, thanks to the day-after-day dependability of the White tractors, complaints average only a 10 a day, a truly remarkable record when you consider that we have 70,000 homes to serve and an intricate maze of alleys to thread."

Perhaps the best indication of the complete satisfaction which motor equipment has given is the authorization made recently by the Board of Public Works and City Purchasing Agent Dwight S. Ritter for

the purchase of two additional White 5-ton trucks and a half-dozen more trailers.

The old trucks are all in good shape to face their third winter and promise to go on indefinitely, according to Mr. Ritter, who characterizes the showing they have made thus far as "an unanswerable argument in favor of the motor method of collection." "I honestly believe

cations, where empty trailers are waiting. The horses are hitched to the empties and lose no time getting out in quest of new loads. Meanwhile White tractors, on their way to the ash dumps, couple the loaded trailers, which have been abandoned at the street corners, to their trains and continue on their respective journeys.

A trailer will hold four cubic

Lewis Hall
Motor Truck Specially
Designed
for Road
Building and
Easily Adapted
to Other Uses.



that nothing but a White could have pulled out of some of the places we encountered the first year, and come back for more punishment", opined Mr. Ritter.

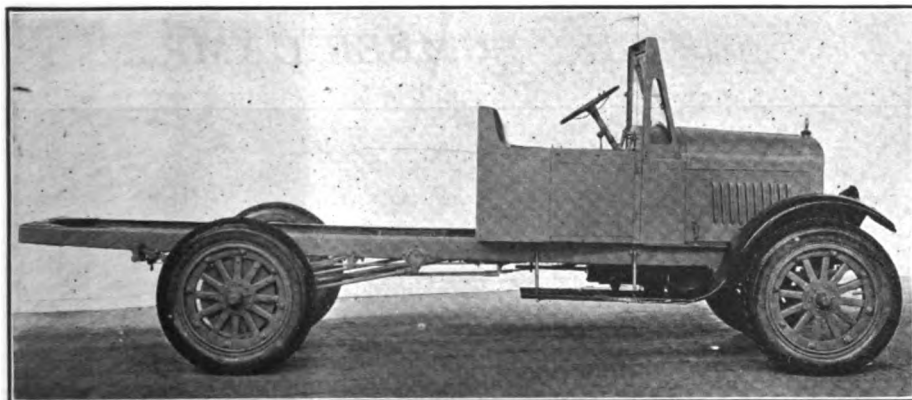
Lost Time Minimized.

The Indianapolis method of ash collection is as follows: Horses hauling trailers, wend through given alley routes collecting ashes from house to house. The loaded trailers are then left at predetermined street lo-

yards of ashes. Each tractor pulls a train of three trailers, making six round trips in a day. The entire fleet of four trucks and 24 trailers thus hauls 288 cubic yards of ashes daily. One cubic yard will weigh between 1100 and 1200 pounds.

One of the outstanding features of the motor equipment is its flexibility, according to Mr. Ritter. The equipment is frequently diverted from ash hauling to snow cleaning.

SPECIFICATIONS OF MENOMINEE TRUCK



Menominee "Hurryton," an Efficient Light Delivery.

SPECIFICATIONS OF MENOMINEE "HURRYTON" TRUCK.

Engine—Wisconsin. Heavy duty truck type. Cylinders, 4 inch bore, 5 inch stroke. Four cylinder cast en bloc and cylinders cast integral with lower half of case. Removable head. Three point suspension. Overhead valves. 3 bearing crankshaft. Combination force feed and splash system of lubrication. Water circulated by centrifugal pump; ample water space around

valves, spark plugs and combustion chambers. Horse Power —SAE—rating 25.60; at 1400 R. P. M., 35; at 1600 R. P. M., 46.

Carburetor—Plain tube type with hot air stove attachment and choker located on instrument board.

Ignition—Eisemann high tension magnet. Spark control by hand lever.

Cooling—Pressed steel type radiator shell mounted on leather pads to absorb shock and vibrations. Cellular type core, 16 inch fan.

Clutch—Multiple disc dry plate type.

Transmission—Selective type. Three speeds forward and reverse. Mounted in unit with clutch and engine.

Propeller Shaft and Universal Joints—Spicer.

Rear Axle—Timken. Spiral bevel gear

Front Axle—Menominee. Drop forged "I" beam section of alloy steel, heat treated, fitted with taper roller bearings.

Brakes—Internal expanding, cam actuated; brake drums 15 inch dia. Width of brake shoes 2½ inches. Service brake operated by foot pedal; emergency brake by hand lever. Both brakes being inside the drums, avoids interference with skid chains.

Control—Left hand drive, center control. Gear shift and emergency brake levers mounted on transmission. Spark control by hand lever on top of steering wheel. Throttle control by hand lever on top of steering wheel and foot accelerator.

Steering Gears—Ross. Extra large bearing surface; provision for ample lubrication. 18 inch steering wheel.

Frame—Pressed steel, heat treated, channel section 5-1-8 inches deep. Length back of seat to end of frame 102 inches. Chassis 30½ inches high, loaded.

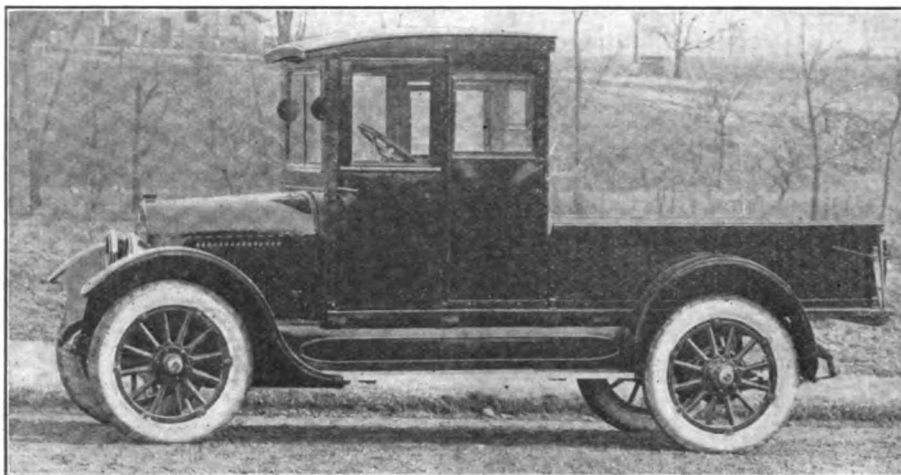
Springs—Front 40 x 2½ inches; half-elliptic. Rear, 50 inches by 2½, half elliptic. Alloy steel.

Wheels—SAE Artillery pattern, made of second growth hickory.

BUICK COMMERCIAL CAR

FITNESS to meet the practical and exacting demands of the busy merchant's requirements is the outstanding advantage of the Buick Special Delivery Car. Utility has been arrived at after a careful study of the business man's needs, with the view of af-

fording him dependable and economical transportation. Furnished in three standard body types, the Special Delivery covers a wide range of usefulness, adapting itself readily to any number of employments where both dependability and economy are important considerations.



Buick Light Truck Meets with Busy Merchant's Requirements.

THE EXPRESS body, with canopy top and vestibule front, as illustrated above, makes an admirable all-weather car of great serviceability. The body possesses exceptional strength and rigidity, achieved by the extra strong bracing and steel binding of the panels, flare boards and tail gate. An additional reinforcement is assured by heavy steel angles running the entire length of the body along each side to form a substantial side frame. The rear end sill is entirely steel bound and scuff strips extend well into the body and bend over to join the reinforcement construction.

The vestibule is equipped with steel sash drop windows, heavily cushioned to prevent rattling. The doors may be securely fastened back for summer driving. The top is of heavy waterproof duck and the dash is metal covered.

The express body with canopy top is equipped with heavy waterproof curtains, which may be lowered quickly and easily to protect the load. The distance from the seat to the tail gate is 70 inches and the width inside is 45 inches. The side panels are 14 inches high. It is finished in blue-black with gold stripe.

SPECIAL DELIVERY CHASSIS SPECIFICATIONS.

Wheelbase—All models, 109 inches.

Motor—Four-cylinder, four cycle, Valve-in-Head type, removable head, automatically lubricated. Unit power plant, suspended at three points from main frame. Cylinders. 3 3/4-inch bore by 4 3/4-inch stroke, semi-steel bloc casting. Extra heavy crankshaft with three unusually large bearings. Properly weighted pistons and connecting rods and flywheel, which, with cylinder dimensions, reduce vibration to a minimum. Exceptionally large valves operated by noiseless adjustable push rods. Thirty-five actual brake horsepower.

Starter—Complete Delco, single unit system, for electric starting, lighting, and

ignition, built as integral part of the motor and operating in conjunction with a large storage battery. Combination switch with ammeter and automatic circuit breaker on instrument board.

Clutch—Multiple disc, dry plate type, smooth in engagement and positive in action. Adjustment very simple and accessible. Light pedal pressure required to operate.

Transmission—Selective sliding gear type, three speeds forward and one reverse. Special heat-treated positive interlocking hand control, integral with gear-set.

Drive—Through single large, automatically lubricated universal joint and fully enclosed propeller shaft, through spiral bevel gears in rear axle. Propeller shaft housing connected directly to rear end of transmission by large ball joint enclosing universal. Both torque and drive take through ball joint.

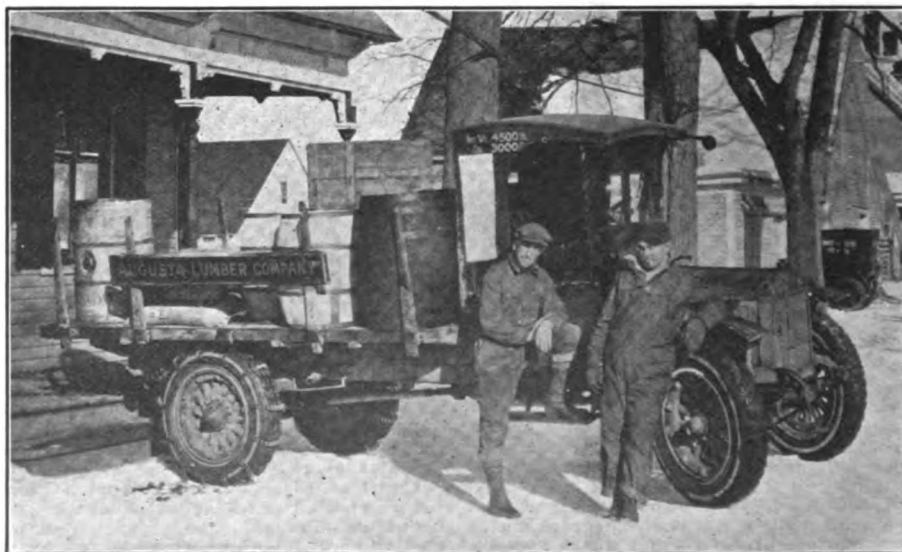
Rear Axle—Three-quarter floating type, which means that all the weight of the car is taken on the axle tubes and only driving torque and a steadying of the wheels taken by the axle shafts. Differential and wheels mounted on high duty bearings; pinion shaft on extra large ball bearings. Spiral bevel type driving gears, fully adjustable. Strut rods keep axle housing in perfect alignment with the propeller tube.

Tires—Tires are 31 x 4 straight side cords.

Standard Equipment—Combination dim and full electric headlights, electric tail lamp and instrument board lamp. Motor driven horn, speedometer, gasoline gauge. Alemite grease gun and a full kit of tools.

Prices F. O. B.—Open Express Delivery, complete, \$945.00; Canopy Top Delivery, complete with roll curtain, \$965.00, with screen sides, add \$50.00; Panel Side Delivery, complete with steel panels, \$980.00, with vehisote panels, add \$25.00.

SUPPLIES LUMBER CAMP



Republic Truck Owned and Operated by Augusta (Me.) Lumber Company.

"Indianapolis to New York"

Thousand Mile Trip Has No Terrors for Husky Trucks of Red Ball Transit Company Which Specializes in Moving Household Furniture

MOVING DAY—What a nightmare it has always been. Unfortunately, it could not be confined to one day, but covered many days. If the moving was from one city to another the time required for this most distasteful of all household work might run into weeks. First, the packer. Everything had to be packed or crated. Then the mover came, and hauled the goods to the freight station. Those who have moved from city to city can well remember how the old freight agent would inspect the various articles.

instructing that this item had to be uncrated, the goods repacked and recreted in order to get the shipment "Under so many inches." After you were able to get by the "rules and regulations," the goods were loaded, along with other less than carload shipments. After the car had been loaded and sealed, the engine switched it around for awhile, and finally it found its place in a long string of freight cars. Probably by this time the household goods and other less than carload shipments were pretty thoroughly mixed.

THE car finally reached destination. Maybe the household goods had been transferred a time or two enroute. Of course it was necessary to load them on a truck or van at destination and haul them to the new home. In turn, they must be unpacked and put in place. What a job this was. Usually some things were found to be missing, others broken, and, most likely, the very best of the furniture had a big scratch right across it.

Hiner Inaugurates New Plan.

W. B. Hiner, General Manager of the Red Ball Transit Company, had experienced these days of moving hardships. Mr. Hiner had a vision of betterment in service, both in the method of transportation and in the time required to effect delivery at destination. He foresaw the saving he could bring to the owner of the shipment, not alone in rates, but in loss and damage, as well as annoyance. Mr. Hiner realized that the way to change moving day was really to move. All this old-time lost motion just meant that much more delay and damage to the goods. He conceived the idea of placing the goods in a truck and taking them directly to destination, regardless of distance.

After working out his plans, organizing the Red Ball Transit Company, with general offices at Indianapolis, Indiana, Mr. Hiner visited the factory of the United



**The Man with the "Big Idea," W. B. Hiner,
General Manager Red Ball Transit Co.,
Indianapolis, Ind.**

States Motor Truck Company to see if they could furnish the equipment necessary to make this new business a success.

A thorough investigation convinced him that this company was in a position to furnish the dependable equipment that he needed, and, as a consequence, he left his initial order for 3-ton trucks equipped with special, fully enclosed van bodies. All equipment of this company is U. S. Motor Truck's.

Successful From Start.

The success of Mr. Hiner's company was assured from the start. Today, you can see their special U. S. Trucks on the highways everywhere covering the states of Illinois, Wisconsin, Iowa, Missouri, Indiana, Michigan, Ohio, Kentucky, West Virginia, Pennsylvania, Maryland, Delaware, New Jersey and New York.

The Red Ball Transit Company have offices in the principal cities of these states and in addition to their main office at Indianapolis, have branches in Cincinnati, Columbus, Dayton, Toledo, Cleveland, Detroit, Chicago, Washington, Pittsburgh, Philadelphia and New York City.

This company has successfully established a unique and economic system of motor transportation of household goods, which effects rapid deliveries requiring long distance hauls. In short, they have cut out the lost motion; that is the whole story.

With their various branches they are always able to arrange return loads so that the trucks never run empty. As a consequence, rates are kept down to a very reasonable figure. One of the principal advantages of this company's plan is that there is no packing or crating of household goods necessary before loading. Consequently, there is no uncrating and unpacking after delivery. The goods are placed in the



Part of the Convoy Turning a Street Corner.

new home ready for use. What an appeal this system carries to the householder. Again there is no transfer at division points, where, with railroad shipments, so much delay and damage occurs.

Furniture Specially Cared For.

When a moving contract is made with the company, a U. S. Truck of the Red Ball Transit Company backs up to the door of the old home. The bric-a-brac and other furniture is removed, curtains and shades are taken down and all packed in these special, fully enclosed vans, where heavy blankets and pads securely protect them and prevent any chance of damage. The company guarantees safe delivery at destination, the household goods are insured, and all the owner has to do is to see to it that the truckmen can enter the new home after they arrive at destination. Before the goods are placed in position inside the house, they are wiped off and polished, then put in place ready for immediate use by the owner.

One of this company's more recent record deliveries was a convoy of trucks making the trip from Indianapolis to New York City. On February 3rd, there were centered in Indianapolis eight trucks loaded with household goods, and these were formed into a convoy attended by a U. S. Utility Truck loaded with supplies, accompanied by a convoy manager and an observer from the United States Motor Truck Company.

Convoy Runs at 15 Miles Per Hour.

The convoy was routed India-

napolis to Dayton, Ohio, and maintained an average speed of 15 miles per hour. Dayton to Columbus, Ohio, was covered at an average speed of 16½ miles. From Columbus to Wheeling W. Va., the average speed was cut down to 8½ miles per hour, for, owing to hills and bad weather, first and second speed traveling was necessary. Wheeling to Pittsburg was covered at an average of 11 miles per hour. From Pittsburg the route lead over the Alleghany Mountains, which were covered by snow and ice, to Gettysburg. On this section the thermometer registered six degrees below zero. While these conditions prevented making any speed tests, they did not hamper the steady movement of the fleet. From Gettysburg the route was via Baltimore, Philadelphia, Newark, Jersey City to New York.

For educational purposes and publicity, the fleet of trucks paraded in cities and towns through which they passed and attracted marked attention. More than 1,000 miles were traveled, yet the total time lost for adjustments and repairs on all trucks was but 5 hours. Despite the fact that it was at the worst season of the year with roads at their poorest, no accident to trucks, loads or operators occurred.

Gasoline Consumption Low.

The consumption of gasoline and oil by the entire fleet was economical, when road conditions, time of the year, and other difficulties are taken into consideration.

The return trip of the "Pacemaker," which was a U. S. Utility Truck, from New York to Indianapolis with full load was made in 40 hours running time. Within 72 hours after they left New York, they were in Indianapolis with everything in good condition.

It means a lot to be able to get away from the extreme annoyance of moving time. Motor trucks have shown their real worth in helping to meet and solve these conditions.

Orvil Thiesen is the new owner of the North Side garage at Jennings, Kan.

Joseph L. White has engaged in the business of automotive engineering as manager and part owner of the firm of Hewitt & White, Oakland, Cal., having severed his connection with the Willys-Overland Pacific Co.

J. Malcolm Randall is on a tour through Russia, Germany and France, and will return to this country about the first of June.



The Pacemaker, a U. S. Utility Truck.

Titan Develops Rear Axle

Original Features Characterize Unit Designed by Well Known Manufacturer to Meet Arduous Duties of Overloading, Road Shock and General Heavy Haulage Conditions.

THE TITAN Truck Company, of Milwaukee, Wis., has developed a rear axle which embodies many new and original features. It was developed to meet the most arduous duties of the motor truck, such as the extreme conditions of sub-grade hauling encountered in road building. The truck has

three very good points. The first is: That the axle is a full floating carrying type; second, it is constructed with a banjo housing which affords flexibility and high road clearance; third, it is built on the gear reduction driving principle, which makes it especially adapted to the arduous work that accompanies heavy haulage.

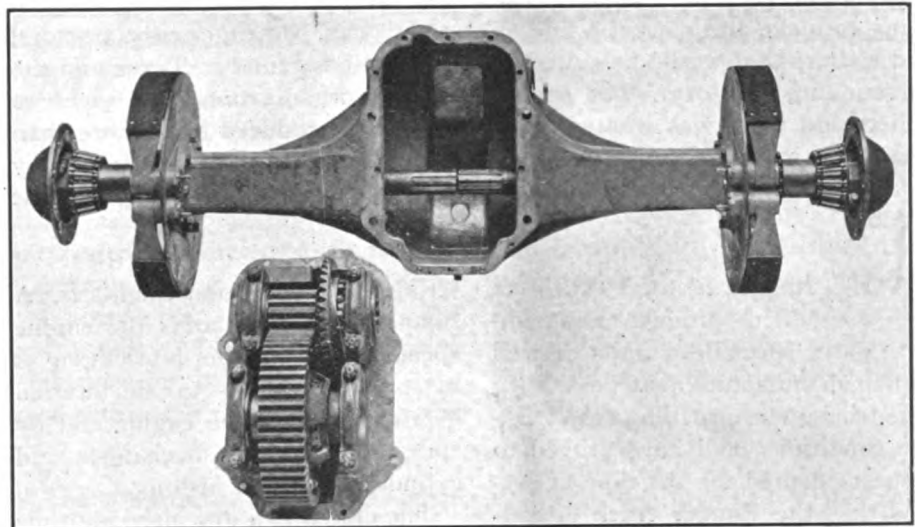


Rear View of Axle Mounted on Truck.

IT IS claimed the full floating feature of the axle separates the load strain from the driving members, so that overloading, road shocks and twisting can in no way cramp or bind the driving elements. The designer states the one piece banjo steel housing affords a continuous double bridge construction from one spring pad to the other,

offering the greatest possible resistance in both upward and downward directions to the road shocks. This

driving gears is in the central head. This unit is itself contained, as it includes the gears and their bear-



Showing Sectional View of the Axle.

allows a moderate weight axle with practically unlimited strength, it is claimed. The entire assembly of

ings, which operate in a bath of oil at all times. This self-containing feature of the axle, in combination with the full floating construction of the load carrying element, insures absolute alignment and quietness at all times, it is stated.

The builder of this axle claims an accessibility heretofore not known on heavy duty truck axles. He states the shafts can be removed without taking off the wheels and the head itself can be taken out by removal of four large bolts and placed on a work bench.

The power reduction is obtained through a set of wide faced bevel gears, and a set of spur gears, operating in a bath of oil. The gears are made of nickel steel and are mounted on chrome nickel steel shafts, which have been subjected to a careful heat treatment.

INTERIOR OF REPUBLIC FACTORY



Note Careful Arrangement of Stock.

Specially Designed for Use in Southwest

MOTOR HAULAGE in the Southwest, in and around the Lone Star State offers peculiar conditions. Much different from those found in the older and more settled sections of the country. Motor truck operators in this section are not as fortunate as are operators in the Eastern sections, where highly improved through routes between large cities exist, but they are forced to travel long distances over ordinary gravel or dirt roads. There are, however, many miles of improved highways in the state of Texas, but, as compared with the size of the state, the proportion is small when rated with the good gravel and dirt roads elsewhere. Travel in and around the oil fields of the state is far from being ideal and, as large quantities of machinery, tools and supplies must be hauled in at frequent intervals, it means that the roads are much used by motor trucks in hauling this material. Heavy hauling of this nature soon cut the surfaces of the roads or trails, and motor trucks are often tried beyond endurance in making these trips.. To meet the demand for trucks that would successfully operate in this type of heavy haulage, the Southern Motor Manufacturing Association, Ltd., of Houston, Texas, was formed; the plan of the concern being to make and market a line of motor trucks, passenger cars, tractors, and trailers that would be suited to the conditions found in Texas and the surrounding territory.. The engineers of the organization were given to understand what was wanted, and the vehicles produced have more than met their expectations, while reports from vehicles sold and in use by owners show that they are giving the best of results in this particular section.

THE Ranger motor truck is an assembled product and employs specialized units of well known manufacture that have been time tried under gruelling road haulage conditions, and have proved to be best adapted for the type of service that the Ranger truck is constructed to give.

Ample Power Furnished by Wisconsin Engine.

The Ranger 2-ton truck is powered by a Wisconsin four-cycle, four cylinder L-head vertical engine having a bore of $3\frac{3}{4}$ inches and stroke of 5 inches, developing under N. A. C. C., rating 22.5 horse-power and suspended at three points in the chassis frame.

Cooling is accomplished by means of a Bush radiator of cellular type and centrifugal water pump in connection with a large four bladed fan driven by flat belt in the rear of the radiator. Ignition is furnished by means of a Dixie, high tension magneto, while carburetion is cared for by a Zenith carburetor and gravity feed from fuel tank under driver's seat. The carburetor is fitted with hot air attachment to vaporize the fuel quickly before en-

tering the combustion chambers. A Simplex governor holds the engine speed normal while lubrication is by pressure pump to all internal bearing units of the engine and by spray to the valve mechanism and cylinder walls and pistons.

The clutch is a dry plate multiple disc type fitting the flywheel in the Standard S. A. E. flywheel housing. The transmission, which is in unit with the engine and clutch, is equipped with three speeds forward and one reverse, selective type. Perfection springs are used, semi-

elliptic front and rear. The front spring is 40 inches long by $2\frac{1}{2}$ inches wide and the rear spring 50 inches long by $2\frac{1}{2}$ inches wide. The chassis frame is a Detroit pressed steel channel type. The steering gear is a heavy duty, nut and screw type, located on the left side with the speed control and emergency brake located in the center of the floor boards.

Timken axles and Timken roller bearings are used front and rear; the front axle is of heavy I-beam construction, fitted with Timken tapered roller bearings in the steering arms. The rear axle is a Timken David Brown worm and worm gear drive of the semi-floating type. The drive from the transmission to the rear axle worm is by means of a three-point propeller assembly, fitted with self-aligning center bearing support at the center universal joint.

The frame, springs and axles are of unusual size to give additional strength and carry the load with a wide margin of safety. All slow-moving bearings are equipped with compression grease cups which supply lubricant according to the needs of the bearings.

Heavy radius rods, attached to the frame members by means of an extended bracket, support the rod at the front end, and the rear end is attached to the axle housing. Swiveled joints on the rods provide for spring action at either end.



Trucks That Will Stand Up and Give Service in Texas Must Be Strong and Well Constructed to Travel Over the Rough Highways of the Lone Star State.

Both brakes, service and emergency are of the internal expanding type and operate on the rear wheels in a large drum bolted to the wheel hubs, and are 16 inches in diameter by $3\frac{1}{2}$ inches wide.

The gasoline tank has a capacity of 16 gallons, and is located under the driver's seat, while the fuel is fed by gravity to the carburetor.

The length of the frame is 16 feet and back of the driver's seat nine feet. The wheels, as regularly equipped, are wood artillery type, made of second growth hickory. Firestone tires, special truck type, are used as regular equipment, 34 by $3\frac{1}{2}$ inches, front pressed on type, and rear, 34 by 5 inch pressed on

type or pneumatic cord truck type tires may be had at an increase in price.

Regular equipment includes lamps, horn and full set of tools. Extra equipment that may be ordered as optional, includes: 36 by 6 inch front tires and 38 by 7 inch rear giant cord pneumatics, and should be ordered special from the factory as they are not sold separately. Prest-O-Lite lighting equipment, including lamps, tank, etc., Standard Ranger cab, complete with windshield, storm curtains, seat cushion, etc.; Standard Ranger stake gate body, with inside measurements of 5 feet 5 inches by 10 feet, fitted with 30 inch stakes,

or Standard Ranger flare-board body, 3 feet 5 inches wide by 10 feet in length and 16 inches deep. The wheelbase is 136 inches and the tread 56 inches.

SPECIFICATIONS.

Engine—Wisconsin CAU, four-cylinder vertical type.
Bore and Stroke— $3\frac{3}{4}$ by 5 inches.
Horse Power—22.5, N. A. C. C.
Carburetor—Zenith with hot air attachment.
Ignition—Dixie High Tension.
Governor—Simplex.
Cooling—Bush Cellular Type Radiator, Centrifugal Water Pump.
Clutch—Dry Plate Multiple Disc Type.
Transmission—Fuller Type in Unit with Engine and Clutch.
Rear Axle—Timken David Brown Worm and Worm Gear.
Wheelbase—136 Inches.
Final Drive—9.25 to One.

L. M. AXLE MEETS WITH APPROVAL

THE SELECTION of the L. M. axle, built by the L. M. Axle Company, Cleveland, for the Bessemer Motor Truck Company, and the exceptional honors accorded it by other engineering authorities, have made the industry, as a whole, interested in its construction. The following high-lights of its design and mechanism are published in order to acquaint the trade with its distinctive construction. A report from the United States Bureau of Standards reads in part: "The axle tests by the bureau showed an efficiency of power transmission of from $94\frac{1}{2}$ to $97\frac{1}{2}$ per cent. at all speeds, and for all powers within the range for which the axle is intended.

THE DRIVE is the Tandem Duplex, which affords the advantage of the straight-line drive, with a minimum of angularity in the propeller shaft, thus reducing rapid wear on the universals and bearings in the rear axle and transmission.

The differential is located before the reduction and in a straight line with the drive of the propeller shaft. This location overcomes many of the old troubles that resulted from the location between or after the reductions. It is of the bevel-gear type, but functions like a semi-

power, locking differential, owing to its location.

Friction resulting from its operation is utilized to gain added traction power. The Tandem Duplex Drive receives lower torque strains and can be made smaller, more compact and more durable than the ordinary type of rear axle.

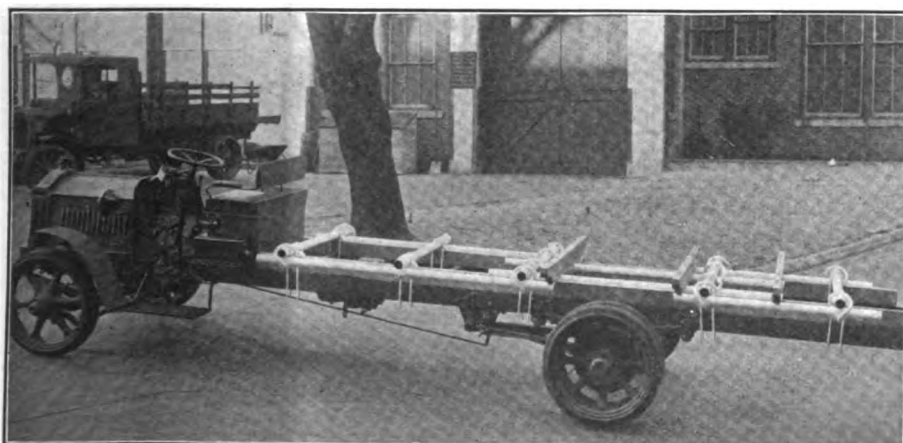
Two sets of brakes are used: A service set and an emergency set. Both are internal and operated by cams which operate against hardened steel plates riveted to aluminum brake shoes. Brakes are housed in for protection and equalized by two beveled-gear, differential type of equalizers. No adjustment for equalizing is necessary.

This axle is said to be very accessible and easily disassembled for inspection or repairs. The opening of the front and rear covers permits the differential and all spur gears and bearings to be removed. At the axle's rear, on the rear cover plate, a differential and pinion-shaft adjustment nut is easily accessible for taking up bearing wear or play.

When the wheels are taken off, the brake shoes can be removed for relining, and the adjustable wheel-bearing nuts are also accessible.

The Tandem Duplex Drive affords a maximum road clearance so necessary for excavating work. Adjustable taper roller bearings are used throughout.

THE HARPER HANGER



Packard Chassis Equipped with Newly Developed Hanger for Body. This Unique Arrangement Operates to Curb Stresses and Strains of Road Shocks.

Organize Bureau of Certification

THE Bureau of Certification has recently been organized by certain men connected in an active way with the automotive industry and its allied branches. It appears that the bureau is formed to safeguard the public from unscrupulous manufacturers who place products on the markets which do not contain the proper materials, are not engineered or manufac-

tured so they will give to the public articles that can be depended upon to render service, and to safeguard the interest of the manufacturer who is turning out an honest article, properly designed and engineered, and manufactured in a plant where proper care and inspection is given to insure quality, fit, finish, and endurance.

IN ORDER to accomplish the above object tentative plans have been drawn up which embody, among other things, the following:

"Only manufacturers, who have a reputation for their fair dealing with the trade and whose reputation for turning out high-grade merchandise, will be invited to join the bureau.

"An efficiency department will be established whose duty it will be to thoroughly investigate the manufacturing plants of the member to check up their manufacturing practice, their ability to make high-grade products, the quality of material used in construction and their methods for testing and inspecting the finished article.

"It is the purpose of the bureau to establish a laboratory which will be in charge of a competent, well known automotive engineer, for the purpose of testing when necessary the products of its members.

"Concerns whose articles have been on the market for a number of years can have their articles certified to, without such tests, but the engineering department will check up all articles from time to time, picking up such products on the open market and testing to insure the public that the quality, workmanship, material and size specifications are being maintained.

"Comparative tests will be made of the like products manufactured by our members to determine an efficiency standard and such tests must show the article of the member to be the equal of or superior to, in general efficiency than any article of the like design or purpose.

"The engineer in charge will make a report of his findings to the certification committee, whose duty will be to pass upon the merits and the efficiency of the article and certify same over the names of the chairman of the committee and the engineer. A certificate will be designed for this purpose and the article or articles certified will be enumerated on same, and sent to the member manufacturer. There will also be designed an emblem or trade mark of a distinct shape and wording, which the manufacturer is licensed to stamp, mark, print, or otherwise use on the article, its package or container of same. The member will also be entitled to advertise that such article or articles have been certified and passed by the bureau of certification.

"This method of checking by a competent engineer, who is not employed by any of the members individually,

will not only be helpful to the purchasing public, but very beneficial to the member in checking up his own engineering and manufacturing departments.

Propaganda

"Publicity is the keynote to the success of the entire enterprise. Every jobber, jobber's salesman, dealer and car owner will be thoroughly advised of the results obtained from the laboratory tests, otherwise these tests will be of no avail.

"At the present, the purchaser is at the mercy of the seller. If the seller is unscrupulous and offers poor materials to his customers, the customer soon loses confidence in every article of a like nature; thus the manufacturer of an honest product suffers. Through the proper publicity given to the certification label, the buying public will be taught to demand the articles that bear this label.

Good jobbers have always desired to handle high-grade material. Through their inability to determine good from bad most of the purchasing agents buy from the concern who sells for the least money and who can deliver the best selling talk, regardless of the real quality of the product. They are forced to buy on a price basis because their competitors, who are not so scrupulous, will undersell them if they don't. The emblem, thoroughly advertised, will eliminate this kind of competition.

"Competition has been, is now, and always will be very keen on all of these products and it is, therefore, of vital importance to every one who purchases them to know that he is getting value received.

Method of Advertising.

"An addressing machine will be purchased and an authentic list of jobbers, dealers, garage and repairmen will be secured and maintained. This list will be used to send out letters, periodically and teach all of this class of purchasers in

the United States and Canada the advisability of paying a little bit more for quality merchandise that bears the insigna of the bureau, not because it bears the insigna but because of the additional cost to build merchandise of quality.

"The address list will be at the service and for the use of the members if they wish to run individual campaigns on their own particular products. Envelopes can be addressed for these members at the absolute cost of labor for the addressing.

"Magazine advertising will also be used extensively, giving the public clean and concise reasons why certified materials should be purchased.

"In all advertising, whether direct, by mail or otherwise, the names of the members of the bureau and the articles they manufacture will be listed.

Membership.

"A committee will be appointed to pass on all the applicants for membership in the bureau, and only concerns of known reputation for manufacturing high grade products, and for their fair trade practices will be admitted.

"A committee appointed by members of the bureau will have the operation of the laboratory in charge, and only men of sterling reputation, integrity and good business methods, will be selected for this important task.

"Manufacturers who are bringing new articles on the market cannot have them certified until a sufficient time is given to actual working tests under regular road conditions, and have proven that their products are fundamentally right.

Financing.

"For the purpose of organizing the bureau and to pay for equipment, etc., an initial fee of \$100 per member will be paid.

In addition to the initial fee, a stipulated sum, an amount to be agreed upon by all members of the bureau will be paid into the treasury each month, on the fifteenth day. This amount can be changed from time to time by the members through a popular vote, as the conditions warrant. As the membership increases, the fees can be reduced or maintained if additional advertising is voted upon, or if the members wish to increase the scope of the work of the bureau.

The amount appropriated for the bureau should be charged to the members advertising fund, so that the expense of the bureau can be paid out of each member's advertising appropriation and, therefore, the operation of the bureau should not cost much, if anymore, than is now being spent for advertising.

AUTOMOBILES REPLACE ICE WAGONS.

THE Knickerbocker Ice Company, New York, is advertising 50 used wagons for sale, as the company is substituting automobiles for horse-drawn vehicles.

Collective advertising by a group of high class manufacturers, banded together to promote the interest of quality products, should so materially reduce each member's sales resistance by offsetting unfavorable propaganda now being spread by less scrupulous concerns, will more than compensate the member, if there is any additional expense. The merchandise offered to the public thru this plan, being distinctly marked with the emblem of quality, will find more ready sale at reasonable prices by virtue of the publicity given to the certified products.

"The bureau will be in charge of various committees, selected by popular vote from the bureau membership, will have the entire operation of policies, plans and expenditures absolutely under their control. This will insure all members of a voice in the operation of the bureau.

"The manufacturers of replacement parts have taken the initiative in starting the bureau due to the fact that its necessity is more apparent to the honest manufacturer of products of this character than of other articles, which do not

in any way effect the operation or maintenance of the car itself. Manufacturers who make poor material endanger the lives of the occupants of the car, cause damage to other parts of the machine that are expensive, and, if the parts are not made of the exact size and construction of the part to be replaced, might cause irreparable damage to other parts as well as an added expense in fitting.

"Reputable manufacturers of material are suffering through inexperienced manufacturers entering the field who produce articles that are offered to the trade and public at greatly reduced figures whose articles do not come up to a reasonable standard. They can easily do this. They have no expensive engineering department to design and test articles that will stand the strain and function properly. This results in the entire industry suffering a loss of business thru these objectional forces.

Export Business.

"The exporter of automotive products from the United States will welcome a move of this kind. They have been taken

in so badly in the past that they are loathe to purchase from this country. The proper propaganda spread in this channel about the certification emblem will give a confidence in this field that will, in itself, bring in sufficient returns in additional business and profits to our members to more than offset any expense for the entire plan.

"Your committee firmly believes that this plan will do more to increase your sales at a very small expense than anything else that has or can be done. Not only will it do this, but it will mean a permanent future for your business on a clean and profitable basis.

"The protection of jobbers, dealers and car owners is necessary to perpetuate our business. Every reputable manufacturer should be ready and willing to help uplift this industry by joining forces with this movement."

Address D. Rosenbach, Room 537-327 S. LaSalle St., Acting Secretary of the Committee for further information and placing your application to join the Bureau of Certification.

WEST STEEL TIRE PRESS

The West 250-ton cast steel press for use in garages or service stations for applying or removing solid rubber tires used on truck wheels has recently been placed on the market. This press is of the usual vertical type, but instead of

mately 13,000 pounds, thus insuring ample margin of safety above the actual requirements for a press of this capacity.

The space between upright strain rods is 43 inches. The opening between top and bottom platens when ram is in low-

from the ram so it can be removed or raised above the ram when necessary to one end and usually arranged for belt drive, with tight and loose pulleys. It also can be furnished with gear and pinion for direct motor drive when preferred that way. The pump has one two-inch plunger for throwing a greater volume of oil or water (whichever is used as a medium of pressure) to fill pipes and cylinder quickly. When a pressure of approximately 200 pounds has been obtained the two-inch plunger is automatically cut out by special by-pass valve, leaving the two smaller plungers in operation for completing the higher pressure required for maximum tonnage.

The press is manufactured by the West Tire Setter Company of Rochester, N. Y.

The West Steel Tire Press Is Constructed Along Well Proven Principles That Make It Comparatively Easy for the Amateur Operator to Effectively Use It in Pressing on and Off the Heaviest of Solid Tires.

Charles B. Rutledge, formerly proprietor of the Auto, Equipment Service Co., Memphis Tenn., has become electrical engineer and manager for the Motor Batteries Co., also of Memphis.

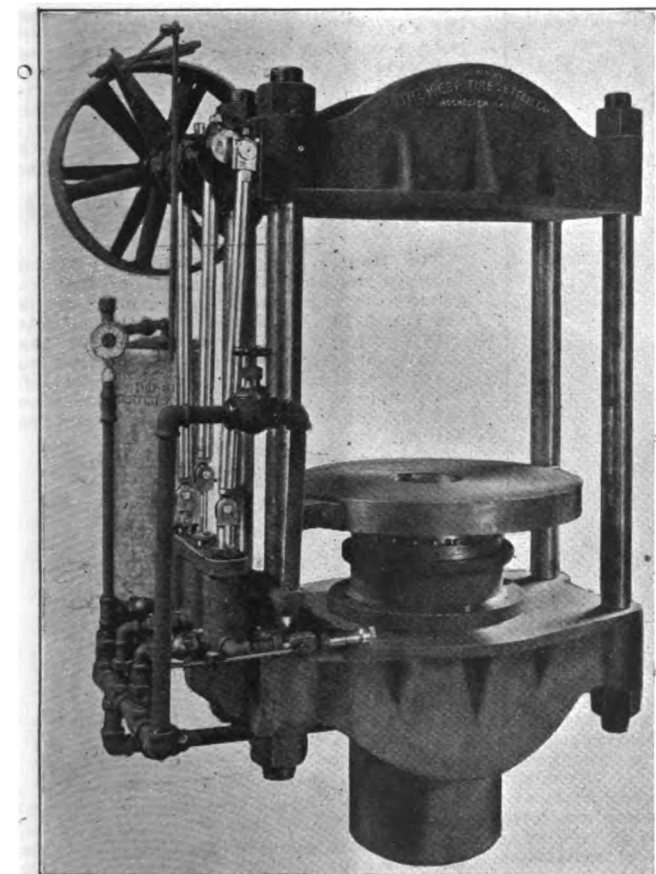
Rudolph H. Sanders has been engaged as assistant chief engineer by the Victor Page Motors Corporation, New York City. He was formerly engine designer for the Williams Motors, Inc., also of New York City.

Amandus W. Almquist has been elected president of the Twin Piston Ring Corporation, West Orange, N. J.

Hinsdale Smith has been elected president of the Smith Springfield Body Corporation, West Springfield, Mass. He was formerly general manager for the Aeromarine Plane & Motor Co., Keyport, N. J.

C. T. Schaefer, formerly engaged in the practice of consulting engineering at St. Louis, has become chief engineer at the Arvac Mfg Co., Anderson, Ind.

John A. Schell, formerly designer for the Hinkley Motors Corporation, Detroit, has become technical service manager for the Morse Chain Co., also of Detroit.



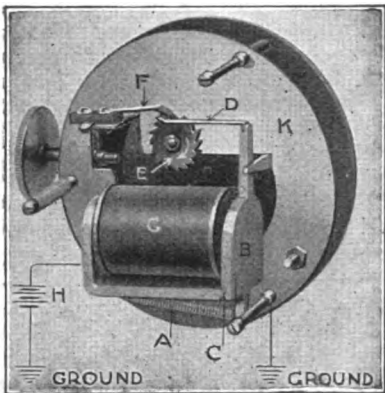
using structural steel beams or channels for resistance pieces is of cast steel, which is very rigid and does away with springing and jumping.

The weight of this press is approxi-

ered position is 37 inches. Platens are 42 inches in diameter. The travel or stroke of ram 33 inches. The upper platen is cast solid with upper resistance piece, but the lower platen is separate

TRUCK AND BUS ACCESSORIES

Keith Landis Electric Clock needs no winding as it does not contain the conventional mainspring. By referring to the accompanying drawing the action of this clock is readily explained. A spiral spring (a) pulls the armature (b) so that the driving pawl (d) drives a non-conducting ratchet wheel (e) in a clock-wise direction. The driving pawl (d) and the holding pawl (f) press downward on the ratchet wheel (e). When the ratchet wheel turns through the length of one tooth the holding pawl (f) drops from the top of the tooth and makes contact with the driving pawl (d), thus completing the



circuit from the battery through the magnet (g). The magnet (g) being energized by the connection attracts the armature (b), pushing the driving pawl (d) over the top of the next tooth in the ratchet wheel. The driving pawl (d) then drops to the bottom of the tooth (f), is held at the top of the tooth and the circuit is broken. The spiral spring (a) then pulls the armature (b) back to position and the entire cycle is repeated.

The turning of the ratchet wheel (e) as explained above, drives the power shaft, which is geared to the center wheel of the watch movement, thus making the clock automatic when a small amount of electricity is supplied to the windings.

These clocks have proved so accurate that the manufacturers issue with each one sold a Fidelity and Casualty Company policy, insuring accuracy to the satisfaction of the user.

Sold by **Thomas O'Brien & Coleman, Incorporated**, 165 East Erie Street, Chicago.

Laco Piston Ring is claimed to instantly reduce friction and afford just the result the motorist desires to make motoring a real pleasure at all times. It was originally developed for use in a locomotive throttle valve, where one ring is required to seal 200 pounds standing pres-



sure at one time. The Laco Piston Ring has now been perfected to meet the most exacting requirements of the automobile engine.

The Laco Piston Ring keeps the seat line unbroken at all times through the use of a diagonal-cut ring placed within a step cut ring with opening opposite each other, absolutely preventing the passage of compressed gas. Both the oil and gas strike an absolutely tight wall, exactly as shown in the illustration. Compression is held indefinitely, through the flexibility of the Laco Piston Ring.

The economy feature of this ring

the Laco ring is claimed to effect a great saving in gasoline, by holding compression; in carbon removing cost; by eliminating the carbon and in oil by keeping it from combustion chamber.

As a sure indication of the confidence of the manufacturers in the efficiency of their product, the Laco Piston Ring is sold with a full money back guarantee in case of any dissatisfaction.

Manufactured by the **Laco Piston Ring Company, Toledo, O.**

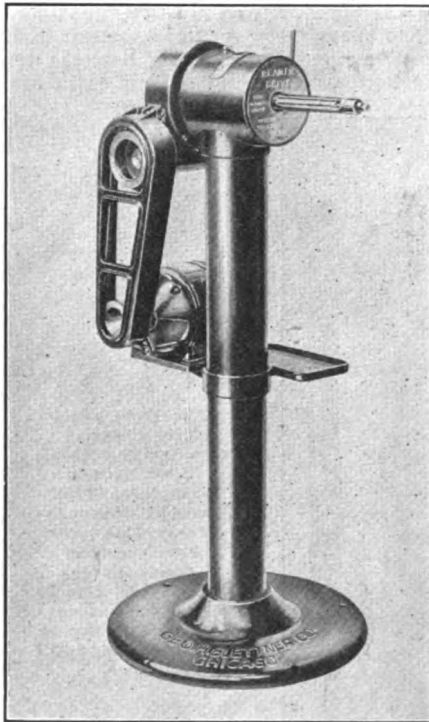
Blettner Power Reaming Machine is operated by a small electric motor placed near the assembling bench and is claimed to do away with the antiquated "strong arm" or manual methods of hand reaming.

By expediting the reaming of finished holes where sizing is essential they improve the quality of the work, reduce the handling charges, save time and the tedious, slow and intermittent work of turning the reamer by hand is eliminated.

The reamed hole produced by a steady power drive is smoother and better finished, of greater accuracy and consequently longer life.

Only 1/6 horsepower is consumed when the machine is used. The gearing of the head is so designed that this force is sufficient to handle reamers as large as 1 1/2 inches.

It is a sturdy, well built machine. All parts are thoroughly safe guarded, read-



ily accessible, enclosed to retain oil for lubrication and the machine is self-contained.

A pedestal of the vertical type carries the driving motor, which is belted through a three-speed cone to a self-locking worm gear reduction which rotates the chuck carrying the reamer.

The operator stands directly in front of the reamer and holding the work free-hand (floating holder) feeds it on to the slow turning reamer (which centralizes itself) with the fastest possible speed, producing better results than with rigid fixtures.

These machines are built and marketed by **Geo. H. Blettner Company**, 1841 W. Jackson Boulevard, Chicago, Ill. Price, \$195 f. o. b. Chicago.

Wefco Spring Cover affords protection of the springs of the car from everything

doing this it prolongs the life of the springs themselves, eliminates annoying squeaks and adds materially to the riding comfort of passenger.

Car owners who have had disagreeable experience with springs whose leaves have become rusted will find much to interest them in the Wefco leather spring cover. The maker states this device has been on the foreign market for approximately three years, during which time ample opportunity has been provided for testing its merits.

The Wefco cover encloses the spring and guide from clip to shackle. One of its features, upon which considerable emphasis is laid by the maker is a system of invisible fastening. Underneath the fastening, a tongue of leather runs the full length of the cover so that there is double protection throughout and the cover cannot wrinkle.



Still another feature worthy of mention is the leather flanges or tubes on both sides of the straps. These flanges grip the ends of the spring tightly when the cover is buckled up and prevents water, dirt and dust from reaching it.

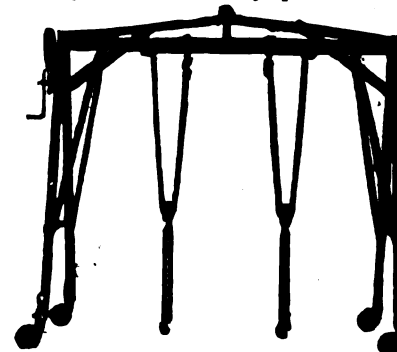
The covers are laced with a specially prepared cable cord, durable and damp-resisting. The leather used in the production of the covers also is specially treated for the purpose, the right proportion of grease being worked into each hide. Each cover is strained onto the spring and as a consequence is said to fit snug and tight and present a neat appearance.

In regard to lubrication, before fitting the covers the springs are well smeared with a suitable grease, two pounds being sufficient to keep the springs in excellent condition indefinitely, as the lubricant is retained between the leaves. With each set of covers a card of complete fitting directions is supplied together, with a needle for threading the lace, the latter making the fitting simple and speedy.

Manufactured by the **Wefco Company**, 439 West 41st Street, New York, N. Y.

The Manley Portable Hoist is claimed to have demonstrated its adaptability to garage service work on account of its stability. The outstanding feature of the Manley Hoist is the positioning of the chains anywhere between the uprights, so that they always lift the load vertically.

Both chains on the Manley Hoist may be instantly located at any point between



the upright frames, for taking out motors, elevating bodies or removing axles, etc. This is done by pushing the chain winding drums, which are suspended from a trolley on a hexagon shaft along the upper frame.

The chains may be used single or double, giving in the first case twice the speed with one-half the leverage, and in the second case the reverse, thus proportioning the leverage to the power required to efficiently and quickly lift any load.

Manufactured by the **Manley Manufac-**

Casey Automatic Windshield Wiper is said to have met with genuine approval, on account of its simplicity of construction and installation.

A small vacuum motor operates from the vacuum tank or intake manifold. It is powerful enough to clear a generous arc of the windshield and keep it clear during the hardest rain, snow or sleet storm.

A small thumb screw adjusts it to operate at any speed desired. It is easily and quickly installed on any type of car, open or closed, by drilling three small holes



through the windshield frame and inserting screws furnished with the outfit. The connection to the intake manifold or the vacuum tank is through a small flexible rubber tube.

The maker states that this windshield wiper costs only a little more than a good hand-operated cleaner and will last for the life of the car. By turning a button the cleaner starts to operate. It affords a clear view of the road—constantly—and leaves both hands free for the careful operation of the car.

Manufactured by the Casey-Hudson Company, 361 E. Ohio Street, Chicago, Ill.

Reellex, a new extension reel trouble light is claimed to meet a certain demand for a neat, compact, reel light, that is always convenient to get at, and not unsightly if mounted in plain view.

It is said that it can be mounted in the tonneau, as a dome light, in the rear compartment of coupes and roadsters, and will not look out of place.

There is an extension cord about 12 feet long in the reel, which will enable



one to reach anywhere around the car, and it requires only an ordinary standard double contact bulb. When mounted on the dash it is claimed that this reel can be connected by using an attachment plug to any detachable spotlight, permitting the light to be carried to any part of the car.

The reel is furnished in black enamel and nickel trimmed, complete with switch to control light.

Manufactured by Grigsby-Granow-Hinds Co., 906 W. Lake Street, Chicago, Ill.

Fris Wheel and Gear Puller is designed for general garage work and is made in four sizes to fit the smallest generator bearing or the largest truck wheel. It has a straight line pull. The power screw it is stated is $\frac{1}{4}$ -inch in diameter, with a No. 14 thread at the arms. High carbon drop forgings are used in the construction of the arms, which insure strength and uniformity. Rivets and pins are of the same carbon steel. The body is an electrical steel casting having three



inches of thread, which eliminates stripping. The capacity is 0 to 18 inches in diameter and 0 to $9\frac{1}{2}$ inches in length. The adjustment is practically automatic and a locking device eliminates excessive gripping power. Weight $12\frac{1}{2}$ pounds. Pulling power, 20 tons.

Manufactured by the Fris Manufacturing Company, Indianapolis, Ind. Prices and other information on request.

Jon-Con Tire and Tube Protector, which is now in use in all parts of the United States and Canada and many foreign countries as well, involves a new theory. A few unenlightened garage and accessory men still cling to the old idea that protectors are for use only in old casings. Jon-Cons were especially designed for use in new or good casings. They are made of one continuous moulded piece of firm elastic, reinforced, and are placed on the inside of the casing between it and the inner tube. This extra rubber naturally takes up some of the air space, which means that less air is needed in the tube, providing greater resiliency and, in consequence, an easier riding car.

The principle reason for casings prematurely going to pieces is that the fab-

ric is broken or damaged, due in most instances to a stone bruise or other sharp abrupt bend. This is where the Jon-Con protector does part of its work, for the reinforcement which it gives acts as a shock-absorbing bridge on the inside of the casing, thus distributing the peak of the blow to a wider area and saving the fabric from breaking. The logical reason then for installing it in a new or good casing is that it may protect the fabric from breakage, the result of which is increased mileage many times over, where-

as it cannot mend the fabric in an old casing after it is once broken. Jon-Cons are longer in circumference than the casing, so that when installed they are compressed into place, not being stretched as the tube and casing are, which is the puncture-proof feature of the device. When a nail pierces the casing, which is stretched, it strikes the protector, which is compressed, and the force of the blow being greater than the resistance, causes the protector to spring in, this forming a vacuum, as the air in the tube behind is not solid. The next revolution of the wheel bends the nail between the protector and the casing, thus preventing it from doing any harm until it can be removed.

Jon Con Tire Protectors combine the merits of being easily installed without the use of cement or tools, do not tear in service, successfully reinforce the tire carcass and can be transferred from one casing to another as the old ones finally wear out.

Manufactured by Jon-Con Tire Protector Company, Philadelphia, Pa.

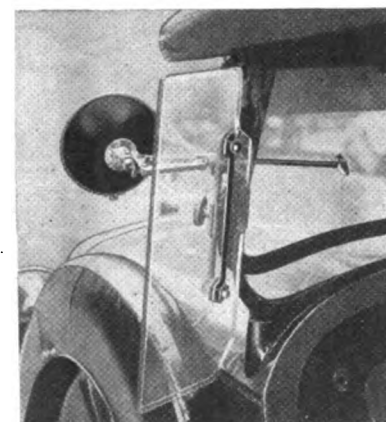
Inner Control Spotlite is claimed to eliminate all discomfort and inconvenience in operation, being always within reach, inside of car. It is not necessary to loosen curtain or lower window



to control the light.

It is rust proof, as all parts are made of phosphorus bronze heavily nickel plated, or aluminum highly polished, and is noted for its rigid construction and adaptability to give good service in actual operation.

The Spotlite is an achievement in both neatness of appearance and strength. The



beauty alone is sufficient to place it among the foremost spotlights it is stated.

It is guaranteed to give perfect satisfaction or your money refunded, and it is claimed one will last as long as the car on which it is installed.

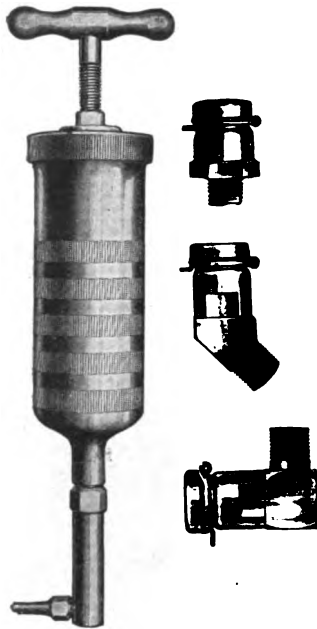
Manufactured by the Cincinnati Lamp and Bracket Company, Cincinnati, O.

(When Writing to Advertisers, Please Mention the MOTOR TRUCK.)

Bowen Empress High Pressure Lubricating System is claimed to be a practical and effective system of lubrication which satisfactorily meets all requirements. Among the principal features are that it is said to effectively handle all grades of grease or oil; one hand operates it and it may be used under pressure or gravity system. It is convenient to handle, simple to operate and cleans and lubricates all working parts of the entire chassis.

It is sturdy of construction, of practical design and provides a positive, quick, easy and clean method of lubricating the car or truck.

One hand operates it. This feature is appreciated when lubricating the more inaccessible bearings. Ample pressure is developed in the gun before applying to the connection, then as the gun nozzle is



thrust into the connection a valve automatically opens, releasing the pressure and the resulting explosive action forces the lubricant into the bearing under high pressure.

It cleans and lubricates. The explosive action by which the lubricant is shot into the bearing, effectually cleans it. All dead grease and dirt which may have accumulated is driven out before an instantaneous flooding of the bearing by a charge of the lubricant shot in under high pressure, leaving the bearing covered



with a film of fresh lubricant.

This gun is drawn from sheet metal and built to withstand hard service. The connections are turned from brass rod and fitted with spring covers easily opened and closed with the gun nozzle. The covers cannot be lost and are always in place on the connections. They revolve, making it easy to lubricate from any position. The spring shackles, steer-

ing spindle and tie rod bolts are carefully heat treated to insure the maximum amount of wear.

Manufactured by the Bowen Products Corporation, Auburn, N. Y.

The Eastern Machine Screw Corporation, manufacturers of the well known H & G Self-Opening Die Heads, is placing on the market a new socket and ratchet wrench set, designed to meet the demand for a wrench set possessing strength, practicability and finished appearance.

The manner in which the sockets are made is one of the features of the set. One practise to obtain the hexagon is to drill a hole having a diameter the same as the measurement across the flats and then broach this hole to a hexagon. The corners are produced by forcing the metal



outwards. This sets up strains which can only be offset by making the walls of the sockets thicker.

The hole for the hexagon in the H & G socket is drilled to diameter of the diagonals—the distance from corner to corner—a considerably larger hole than that used in the broaching process. The metal is then drawn in to form the hexagon, which condenses and toughens the metal.

The head of the socket is a hexagon and the various units of the set fit over this head, affording better purchase than that afforded by inserting a square hole in the head of the socket.

The sockets are heat treated and hardened by a special three-stage process. First, carbonization; second, refining; third, hardening. Exceptional strength and durability is claimed for the sockets. Special care is taken to have the sockets fit the nuts accurately.

The set is packed in an attractive hard wood box with a place for each part and consists of 10 sockets, an adjustable T handle, reversible ratchet, extension piece, universal joint milled from bar stock and two screw drivers. All of these units are specially heat-treated, hardened and finished. A drop-forged box wrench, hardened by the cyanide process, is also included for use where head room is not sufficient to allow the use of the other tools.

Each female part of the wrench attachments has a split screw made from spring steel, which furnishes the proper friction to hold the different parts together while in use.

Manufactured by the Eastern Machine Screw Corporation, New Haven, Conn.

Esta-Brite, a superior auto and furniture polish is no new product, however it has proven its worth to those who have

been fortunate enough to be able to get it. It not only polishes, but cleans as well. It is wonderfully efficient as a renewer to old leather upholstery. It is used on display cars, service cars and by demonstrators of leading manufacturers, who recommend it highly as a preservative for the original finish.

It is indispensable to the housekeeper who takes pride in the appearance of her furniture and wood work. It cleans and polishes white enameled furniture and wood work as efficiently as other finishes, and is a peerless cleaner of enameled



beds. Being manufactured exclusively from liquids and containing no alcohol, benzine, turpentine or other varnish removers, it cannot scratch or injure the highest finish. There is no danger of soiling the most delicate clothing by contact with surfaces properly treated with Esta-Brite. It is used in the finest homes and hotels.

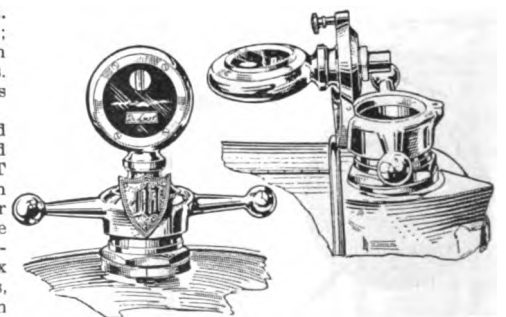
Esta-Brite is the result of years of experimenting and was perfected by C. H. Estes, who is now president.

Manufactured by the Queen City Specialty Company, Cincinnati, O.

Monogram Automatic Locking Radiator Cap is a radiator cap which makes it possible to fill the radiator without removing anything from the car. It also is claimed to prevent any thief from stealing the Motor-Meter without the necessity of keys or locks to prevent it.

The Monogram Cap is steam and water tight and screws on like an ordinary cap, but it does not screw off without the

MONOGRAM The Automatic Locking Radiator Cap



drastic use of shop tools. The motorist's lodge emblem or personal initial may be placed on the cap in a tasteful design of metal sculpture appropriate for the best cars.

It is a highly finished article of clever workmanship and is claimed to be simple and durable, making it possible for anyone to attach it.

Manufactured by the General Automotive Corporation, Wrigley Building, Chicago, Ill.

(When Writing to Advertisers, Please Mention the MOTOR TRUCK.)

Tom Snyder Talks on Transportation

THE Progress Report of the National Committee on "The Highway Transport Clearing House," presented to the National Highway Transport Association at the May meeting of that body is of timely interest, offering as it does a method that cannot be too strongly recommended as going a long way

toward stabilizing freight transport by motor trucks. Mr. Snyder, who is chairman of the committee, has been long identified with motor truck transportation and is particularly well fitted by experience to discuss its various phases, as will be seen by the report which is printed in its entirety.

A FEW years ago the "Highway Transport Clearing House" was considered as a passable future development in highway transportation, today it is seen by all those who try to apply motor transport as a definite dependable service in transportation, an absolute necessity.

It can be safely said that intercity motor express, or rural motor express, cannot be generally and successfully applied except through the service of a motor transport clearing house.

The successful operation of one, two or three trucks from some shipping center out to some rural community or to a number of small towns is but one step in the experimental stage, and is not sufficient evidence of the applicability of motor transport as a definite system of transportation.

The big question coming from the shipper, the consignee, the public and the railways today is, can the highway and the motor truck take the short haul L. C. L. freight off the hands of railways?

Even if the answer is yes, with the provision that time for its proper development must be allowed, it immediately suggests system, uniform methods and crystalization. **We cannot build confidence, nor can we hold confidence already developed by telling the shipper that he can have motor transport service over the Jackson highway, but not over the Lincoln highway, that the carrier rate over the Jackson highway is two cents per 100 pounds per mile on first class with a varying rate for lower classifications, while the carrier rate over the Great Lakes highway is 1½ cents per 100 pounds per mile, with no classifications, that there is no store door delivery charge on shipments over the Bingo highway, but that such a service fee is**

collected on shipments over the Johnson highway.

We can no longer satisfy the shipper or consignee with the fact that Truck Operator Jones who, though he is responsible financially for the goods turned over to him, also carries a dependable cargo insurance policy, while Operator Smith is not responsible and is also without insurance, but that Smith hauls for a lower rate than Jones.

The greatest need in the development of motor transport as a dependable transportation service out of all American industrial centers is the establishment of motor transport terminals and clearing houses.

A highway transport clearing house is an established station from which highway transport shipments can be cleared from the shipper to the transportation trucks, operating over any or all highways over which transportation service is being rendered.

It is a centralizing station to which jobbers, manufacturers, merchants and every variety of shipper can bring his consignments, big or little, and from which station, rural motor express trucks, intercity motor express trucks, highway transport trucks, load and depart according to route schedules, or special service arrangements.

It is also a station to which agricultural products, eggs, poultry, butter, cream and other commodities can be shipped and cleared to consignees, be they individual citizens, merchant, jobber or manufacturer.

The great service of a motor transport clearing house will be to meet the fluctuating demand for motor transport, to fix rates, determine classifications, maintain schedules, and to educate the shipper, the consignee, and the general public as to the advantages of this type of trans-

portation.

Motor transport has not been developed as a broad dependable system of transportation.

Splendid Service Given.

Splendid service is being rendered between many cities throughout America, and this often where the keenest kind of steel rail competition exists, while many rural communities in great need of motor transport service are not served.

Many routes have been established to serve communities where steel rail service is far below the transportation demands, but much of the service now being rendered, good or bad, is but blind adventure.

Classifications as established by the common carriers are rarely observed by the motor transport systems, the non-observance of such classifications already established being the cause of the failure in many transport adventures.

Rates for transportation are as yet the most indefinite element in the entire industry.

Cooperation between operators for the development of economical shippers pick-ups and consignees delivery systems is as yet unknown, schedules are indefinite, and service capacity often inadequate to meet shippers demands.

These and many other barriers to the practical application and industrial economy of motor transport could be quickly overcome through a motor transport clearing house.

Clearing House Stabilizing Influence.

A clearing house is a centralizing point of activity where ideas and methods can be cleared as well as tonnage, and highway transport is now waiting the stabilizing influence of uniform and dependable methods.

Clearing houses and the clearing house system in all freight clearing centers are of constantly increasing

importance, and as time and economy in clearing shipments are being recognized as the major portion of the transportation problem, the motor transport terminal comes rapidly to the foreground as a tremendous factor in the entire scheme of transportation.

The major portion of all shipments are consigned to a place, and not to the consignee, and though the consignee may be a farmer or a rural merchant within a few miles of the freight terminal and though this distance may be but a fraction of the transportation distance, it is very often the most expensive leg of the service both in time and money.

Transportation is not complete until the consignment reaches the consignee, and yet in our present system a very definite interruption takes place where consignment reaches the terminal, at nearest point to destination.

This interruption takes place because the rail or water carrier feels that its responsibility ends at its terminal, and the consignee is expected to complete the transportation service, with the result that terminal congestion is adding millions to the cost of transportation, and additional millions because of demurrages and store house charges.

Store Door Delivery Being Considered.

Store door delivery is now being considered by many of America's largest shippers as a means of providing a continuous transportation service from shipper to consignee, and to provide that the service be extended to all consignees within motor transport distance of rail or water way terminals.

Store door delivery as a relief to terminal congestion and its many kindred evils immediately involves the application of highway transportation as the service could profitably and practically be extended to consignees 40 or 50 miles away from terminal and to farther points if no rail service was available.

With the adoption of store door delivery service, motor transport clearing houses would become an absolute necessity, and with the establishment of motor transport clearing houses, the connecting link

between all methods of transportation would be quickly welded.

A new element of clearing freight through all terminals enters at this point, the greatest step towards improvement in transportation would be taken, and the greatest need that all common carriers are now facing would be provided.

A motor transport clearing system would become the connecting link and the immediate outlet to and from all common carrier terminals.

With the extension of this service to points over a 50-mile zone the benefits would be increased in proportion to the tonnage transported.

Transportation has long awaited the coming of the motor truck and the motor truck will enter fully into its place as a great transportation agent when the crystalizing influence of motor transport clearing houses will apply it as only such an institution can make the application.

Only through the development of highway transport can transportation keep pace with the rapid development in production.

Will Always Be Short Haul Service.

Highway transportation will always be a comparatively short haul service, and its applicability and economy will lie in its speed and flexibility.

A motor transport clearing house will provide an uninterrupted rapid transportation service from the farm yard to the industrial citizens door, or from the wholesalers or warehouse platform to the rural merchants store door.

As railways are relieved of this short haul service much of the ever prevalent terminal congestion, and its accompanying embargoes and demurrages will disappear, and a greatly improved service in long hauls will result.

Clearing House Foundation for Uniform Methods.

No doubt the greatest need of motor transport today in establishing itself as a definite mode of transportation is some system of uniform methods.

Many motor transport adventures are being made around every industrial center in America. Some of these adventures are being made by

individuals who operate one, two or three trucks, other adventures embrace the operation of fleets of 10, 20 or 30 trucks.

Some operators depend upon the one-way haul, such as the live-stock haulers; others regulate their service subject to a two-way load.

Some operators who see the need of protection to consignments and service to shipper, provide themselves with specially built enclosed bodies, available trailers to care for unexpected service calls, dependable drivers, who keep accurate records and make careful deliveries, while others pay little attention to these details, but get business because of lower transportation charge.

Transportation rates are not uniform, some operators hauling at the common carrier first class rate, adding a pick-up and store door delivery charge, while others adopt an arbitrary rate above or below the common carrier rate as they see fit, and make no pick-up charge, and often no store door delivery charge.

Some operators adopt time schedules, and make it their business to keep them, having extra available trucks in case of a break down, while others operate very much at random.

The pick-up at shippers' platform methods, make motor transport a random service, and subjects the truck operator to many delays due to shipment not being ready when he reaches shippers' platform, as truck operator has no control over shipping departments, and as limited platform space may cost him many delays he has no chance of fixing schedules for reaching shipper.

The pick-up at platform method prevents operators from loading consignments to truck and provides for an unloading order, his last consignment picked up might be consigned to the last stop on his route or the reverse.

A motor transport clearing house would make possible the elimination of all of these evils, in fact its very service would be the adoption of a system, of uniform methods, first for the information of the shipper and consignee, and second as a service to efficient transportation.

Type of Motor Transport Clearing Houses.

Large industrial centers with well populated surrounding territory will require an out-bound and an in-bound building or section.

These terminals could be established and sustained as a private enterprise and be made profitable through a terminal hundred weight or package fee, to be added to the transportation charges, and through the operation of a cartage system which would be in great demand on pick-ups and deliveries to consignees and from shippers who do not operate their own cartage vehicles and from thousands of individual citizens who through highway transport and motor terminal service will become the consignees of agricultural producers.

These terminals should be established and sustained through the co-operation of wholesale shippers' associations, farm federations and motor transport organizations.

Layout of Buildings.

1. The buildings should be long and narrow, providing the greatest possible amount of platform space on each side of building, insuring relief from either building platform or vehicle congestion.

2. The building should be divided into route sections, local cartage vehicles delivering to platform on one side of building within route sections according to consignments, these consignments handled through narrow building to out-bound platform for shipment that day, or left within building if scheduled for following day shipment.

3. The in-bound building or section should be of the same character, permitting in-bound transport truck to unload cargoes on one side of building and local cartage vehicles to clear from opposite side.

4. Because of the flexibility of motor transport, terminals will be very well cleared daily.

5. For out-bound terminal, shipments consigned to routes over which less than daily service is rendered, should not be received earlier than one day prior to schedule departure of truck.

6. Schedules should be established over all routes offering ton-

nage in exchange for service, the terminal clearing house keeping all shippers informed as to schedules, transport rates and service offered.

7. The first service of a motor transport clearing house would be to provide a freight station through which highway transport shipments could be cleared from shipper's vehicle to transport truck, and from transport truck to cartage vehicle, but its greatest service would be to act as an intelligence bureau.

Any common carrier can give the shipper all details as to rates, classifications, distance and service schedules over its own lines, but has no interest in the same conditions over other lines.

In highway transport every highway leading out of every industrial center in America becomes a transportation line to the shipper, and each of these transportation lines may have a varying number of transportation operators rendering service over it.

A highway transport clearing house at which all operators should register their service schedules could issue complete bulletins to shippers, and thus supply shippers with the very information which they need, but without such a clearing house they have no way of securing it.

Make Contract with Private Owners.

Many private truck owners can be found within or around industrial centers with whom contracts can be made to operate over highway routes on schedule if the terminal clearing house will centralize the industrial demand for service.

In smaller towns and cities in which highway tonnage is not great enough to sustain a motor transport terminal, storage warehouse and regular transfer or trucking firms are rapidly taking on this service and because many of them operate a cartage business in connection with warehousing, or are regularly engaged in cartage service, find that it fits in splendidly and adds to their regular business.

Clearing House Gateway to and from Highways.

It may seem unreasonable to say that the public cannot avail itself of the advantages of highway trans-

portation, but this is true nevertheless.

A great majority of regular shippers are deprived of this transportation resource, because only those whose consignments over given routes are sufficiently large to warrant special arrangements for such service, can secure it.

The agriculturist cannot consign a bag of potatoes to the industrial or city consumer, because of the absence of a clearing house through which the potatoes could be cleared to a city cartage vehicle, nor can he consign a crate of eggs or any other products, to the city retailer or broker for the same reason.

The theory that all shipments to be transported by motor truck can be picked up at the shippers' platform by the transport truck, and that the highway transport truck can also deliver to store door, or be successfully applied as a cartage vehicle must be given up.

This statement may excite considerable opposition, because so much has been said and written about the motor truck rendering a service direct from shipper to consignee and that because of such service unnecessary handling of freight has been saved, which is all true, but which will be the special or rare case when motor transport is broadly applied as a definite link in the whole service of transportation.

I know of no important industrial center in America from which (within the next six years) less than eight different motor transport routes will be operated, and from some centers this number may be increased to from 20 to 30.

It would be a daily occurrence for some shippers to have consignments for each of these routes, and limited platform space which has long been a menace to American industry would prevent the transport truck, from each of these routes, picking up their route consignments.

Many shippers have said that they would gladly use motor transport for all short haul consignments if their shipping departments could load motor transport consignments to their own freight delivering vehicles, to be dropped off at a motor transport terminal while making

daily deliveries to all other terminals.

A public motor transport terminal and clearing house becomes a gateway to and from all highways; it will supply that definite point of contact which highway transport now lacks; it will develop that responsibility and dependability which the shipper wants; it will become a crystalizing point from which an analysis of possibility and application of motor transport can be made; it will make every citizen in every industrial center of America the consignee of every producing farmer within 50 miles of that industrial center.

Every rural merchant in this same territory will be brought within six hours of his base of supply.

The highway will never serve its ultimate purpose until every citizen, consumer or producer has dependable and practical access to it, and this is not possible except through a highway transport terminal and clearing house.

Indianapolis Leads in Truck Transport.

As evidence of the need and constructive advantage of motor transport clearing houses, Indianapolis no doubt offers the best illustration in America.

Motor transport routes have been operated out of Indianapolis for the past eight years and up to the summer of 1921 nine operators out of 10 went down in failure and defeat.

Indianapolis has seven steam and 12 electric traction lines radiating from it in all directions and the successful application of motor transport with such competition requires system.

In 1920 a clearing house system was organized and began the work of standardizing motor transport, fixing routes, establishing schedules, fixing rates, adopting a uniform bill of lading and freight receipt, with the result that commencing April 15, 1922, 10 definite inter-city motor express routes, all operating out of one terminal freight house, and under the direction of one clearing house, each route being handled by one or two different operators were put into service.

The shipments for all of these routes are solicited by a personal and telephone canvass through the clearing house, and it is the rare thing to find any of these trucks leaving the city with less than a capacity load.

Some of these routes are sustaining four trucks, five of them having an operator at each end, which plan will be adopted on each route.

Providing for an operator at the terminal end of each route solves the terminal and distribution problem at these route terminals and adds materially to the resources for meeting emergencies.

The route terminal operated by responsible cartage or commercial warehousemen located at the terminal has solved the problem of the return load.

The Indianapolis central freight station has been established in a section of a commercial warehouse, the operator paying out of his pocket the regular warehouse in and out fee of four cents per hundred, to cover freight terminal cost.

This fee of 80 cents per ton relieves the truck operator from the service of picking up his load from shippers' platform, enables him to load his truck providing for economical unloading, complete freight bills for each shipment with rates, weights and classification and fees to be collected indicated.

When shippers are instructed that regular schedules are maintained, shipments are sent to the terminal with the idea of securing this better service to consignee, and truck operators are enabled to keep their regular schedules.

The clearing office and freight soliciting department is sustained by fee of \$1 per ton, which is paid by the operator out of his service income.

Insurance covering every passable loss to shipper or consignee, excepting pilferage, is paid by the operator at the rate of 12 cents per \$100 value.

The following rates are collected to which is added a store door delivery fee of 25 cents for each stop and five cents per hundred weight:

	1st class	2nd class	3rd class
1 to 5 miles....	.32	.27 ½	.21 ½
6 to 10 miles....	.34 ½	.29 ½	.23
11 to 15 miles....	.35 ½	.30	.24
16 to 20 miles....	.38 ½	.33	.26
21 to 25 miles....	.40 ½	.34 ½	.27 ½
26 to 30 miles....	.42	.35 ½	.28
31 to 35 miles....	.45	.38	.30
36 to 40 miles....	.46	.39	.31
41 to 45 miles....	.48 ½	.41 ½	.32
46 to 50 miles....	.51	.43 ½	.34 ½
51 to 55 miles....	.52	.44	.35
56 to 60 miles....	.52 ½	.45	.35
61 to 65 miles....	.53	.45 ½	.35 ½
66 to 70 miles....	.54 ½	.46	.36 ½
71 to 75 miles....	.55 ½	.47	.37

The plan has worked out so well that the Central Public Warehouse Company, which is now building a new commercial warehouse of 250,000 square feet capacity, has included in its building plans, the floor and platform facilities for all Inter-City Motor Express trucks now operating out of Indianapolis.

As a large volume of the tonnage now being transported by motor truck from industrial centers to rural communities is now being loaded at commercial warehouses, and as rapidly developing new sales and distribution methods will increase this volume, your committee on motor transport clearing houses suggest as an important early step in its activities that this committee recommend to the American Warehousemen's association the provision for motor transport facilities in all new commercial warehouses.

Your committee also recommends that the constructive need of motor transport clearing houses as a means of stabilizing highway transportation be brought to the attention of all interests devoted to, and affected by, transportation problems.

J. Howard Rees has been appointed export manager of the Hudson Motor Car Co., Detroit. He was formerly supervisor in the export service department of the Hudson organization and resigned about 2 years ago to place a car of his own design on the market. With this object in view, he organized the Rees Motor Co., Columbus, Ohio, of which he was elected president and general manager.

John M. Riordan has severed his connection with the Vahan Products Co., Cleveland, where he was manager. His future plans have not been announced.

S. B. Roberts has been appointed assistant engineer and chief inspector for the Ward Motor Vehicle Co., Mount Vernon, N. Y.

Albert W. Russell has been elected president of the Detroit Bevel Gear Co., Detroit.

Roads and the Load

(By THOMAS H. MACDONALD, Chief of U. S. Bureau of Public Roads.)*

GENTLEMEN, we have sometimes a coin of the realm known as a copper cent which is not a greatly respected coin.

Our milkman drives a truck. It is rather a large truck and it so happens frequently that as I come downstairs in the morning after he has been there I see deposited on the front step the daily portion of milk—we are not able to get the milkmen who come on trucks to deliver milk to the back door.

THAT was the cost of the American highways to the individual man, woman and child in this country last year after deducting the exact revenue which the automobile contributed in fees to the road built. The amount deducted does not include any of the intangible income from motor vehicles. It does seem to me, therefore, that we can afford the highways.

Perhaps I am not exactly accurate, the cost may be about one and one-tenth cents as near as we can estimate it.

I have contemplated the poorest child in the poorest tenement district in New York City and I have wondered if we could decrease the bill to him of our American highways, if we can consider that the transportation of food which he eats is not worth at least one penny per day. I cannot conceive of any one in this country whose tangible personal benefit from the American highways is not at least one copper cent per day from the highways themselves.

We are thinking of highways and automobiles in combination. We are thinking of them as transportation of a certain form. I believe that we should realize that the United States is founded upon the possibility of maintaining a sufficient and efficient transportation system. And we should not think of transportation over the highways or highway transportation alone, but should think of transportation over the railroads and over the waterways as well.

*(Speech made at a dinner given by Highways Committee, N. A. C. C.)

Now I am very fond of milk and particularly of what comes on top of the milk, and I do not consider a day well begun unless I have oatmeal and cream.

I figure that the cost of the highway in the transportation of that milk, which I consider essential to my personal well-being—to me as the average American citizen is this little respected penny and the highway cost of all of the rest of my food which is transported over the roads is nothing at all.

Road Building Programme Far Behind Traffic Increase.

In the building of our railway systems, the same individual or corporation, the same owner, owned both the rolling stock and the roadbed. In highway transport the individual owns the rolling stock while the public has undertaken to provide the roadbed. It has not up to this time done a very good job.

In 1910 we were spending for all highway purposes in the United States about \$120,000,000. That was largely for the horse-drawn vehicle and its expenditure constituted pretty largely a service to the agricultural population, which at this time represents about 40 per cent. of our people. At the same time in 1910 there were only about 500,000 automobiles in the country.

In the 11-year period we have increased our motor vehicle registration about 1800 per cent. and we have only increased our effective road expenditures for road purposes about 400 per cent. Thus we have been lagging very far behind in the building of roadbeds for the rolling stock.

In 1921 our estimate of the accumulated investment in highways for the 11-year period was \$2,526,000,000, exclusive of the amount we have spent for maintenance each year. The estimate of rolling stock values is \$8,790,000,000. That is, there has been over three times as much investment in rolling stock between 1910 and 1921 as we have expended during the same period for highway construction.

Our expenses last year for all road purposes were about \$600,000,000.

That includes not only the federal and state expenditures for the main state highways but the local expenditures outside of the municipalities, such as the township, county and district expenditures. And based on that total estimated cost is my estimate that it costs the American individual, each man, woman and child in the United States, about one penny per day for the highways.

Because of the large appropriation made by the Congress for federal aid we have obtained the erroneous impression that the federal government is the backbone of the highway movement. Our estimate of the amount that the federal government contributed last year toward the total bill for highways was only about 14 per cent., and the portion of the cost which the automobile paid in direct taxes we figure at about 19 per cent. That is, between the federal government and the automobile itself we paid about 33 per cent. of our total bill. That leaves 67 per cent. to be paid from other sources largely taxes, partially bond and partially direct.

Most of Things We Believe About Highways Not So.

Most of the things that we have known about highways are not so. You will find flat contradictions of practically everything we have accepted as trite and academic and almost proverbial.

For example, we have had it imposed upon us almost as a commandment that thou shalt not build a road which will not last longer than the life of the bond. I think all of us will agree to that as a general proposition, but the only thing that

is the matter with it as I see it, is that it is not so.

The State of New York issued bonds for \$100,000,000 and I have seen within very recent times articles written in which it is said that the roads are going to pieces so badly that they will be gone before the bonds have been paid. Probably the road surfaces built with the proceeds of those particular bonds will be gone before the bonds are paid. But it is a fact that this year in New York state we are in cooperation with the state, widening those old macadam roads with 18 feet of concrete, leaving a strip of the old macadam in the middle.

This work has only just begun, but successfully so, making a 24-foot surfaced roadway in place of the old 12 or 14 foot macadam surface, on the same roadbed that was built with the bond money and at a cost of new construction of concrete 18 feet wide to absorb the first cost that the state has invested.

In other words, so far as I can see it, New York state by the investment of \$100,000,000 and by building cheap roads, when her needs were for cheap roads, has been having service of those roads all these years at not to exceed the interest cost, and has all the investment left. And we will have to have a marked change in the price standards that we have now reached before that fact is not so.

When you think of cheap roads, sand clay roads, gravel roads, macadam roads, you should think of them in a somewhat different way than you have in the past; you must think of them as cheap roads plus maintenance. Much of the original value in roads has disappeared simply through lack of maintenance, and as the roads are placed more and more under state supervision and systematic maintenance is given them, we find that we obtain real service from these cheaper types.

The federal legislation which was passed last year provided that federal funds shall be expended upon a definite system which shall not exceed seven per cent. of the public road mileage within the country. That system we estimate will reach 180,000 to 190,000 miles of public

highways and, when completed, it will connect practically all of the county seats within each state.

There will be a gridiron of roads crossing each state, touching or connecting each county seat with the adjoining county seat, and thus interconnecting at the state borders with the roads from other states. So that it should be possible eventually, when you get upon a road at any point in one part of the country to go to any other county seat point in any other part of the country without leaving that particular federal aid system of roads.

It is going to take a long time to do this work, but we are engaged upon a very large work.

Shall We Take Ten Years or Twenty to Build System?

The whole system, as I see it, in regard to the federal aid system of building roads is, having started upon the building of the system, how fast are we going forward? There has been appropriated by the Congress to the states for helping to build this system of roads, \$340,000,000. We have placed under contract about \$214,000,000 and have the remainder of it still to place under contract, \$126,000,000 of which we expect from 40,000,000 to 60,000,000 to go under contract before the first of this July. That is, by the first of this July we will not have funds sufficient to run another year unless further appropriations are made.

Now I am not pleading for appropriations, I am only bringing this viewpoint before you.

With 10,000,000 of motor vehicles in this country, how long can we wait for a system of roadbeds over which to operate that rolling stock?

If we conclude that we are willing to spend from the federal treasury \$50,000,000 per year, taking into consideration the 70,000 miles of road already improved, and leaving a balance of say 120,000 miles, it will take in the neighborhood of 20 years to do the job. Are we willing to wait 20 years to get a system of roads that will extend from county seat to county seat, understand, not all paved roads by any means?

If we conclude that we can spend

\$75,000,000 per year from the federal treasury we can do this job, assuming that we can still impose on the states as we have been doing in the past, when under a law that says we can pay 50 per cent. of the cost we have been getting along with paying 42 per cent. the states paying the remainder because they were in a bigger hurry than the federal government—if we conclude we can pay \$75,000,000 per year it will take us 15 years. If we conclude that we can afford \$100,000,000 a year we can do the job in 10 years.

That is the fact that has to be decided by the Congress and by us here and by the people in the United States who are going to use 10,000,000 motor vehicles this year, whether they are willing to wait 10 or 15 or 20 years for a system of improved roads.

This system of improved roads, as I say, will not all be paved roads. The mileage which has been built up to the present time through the state and federal funds has been about 70 per cent. of the cheaper types. But the reverse is true as to the cost. The 30 per cent., or the modern paved roads which are being built—will cost in the neighborhood of 62 per cent. of the total fund. So that the larger mileage is costing only about 38 per cent. But we must take into consideration that in very many parts of the United States the cheaper forms of highways will serve adequately if maintained and it is a requirement of the federal law that if the states are to secure continued federal appropriations they must undertake, as states, the maintenance of the highways and must put the federal aid system under patrol, which means that someone is responsible for every mile of highways within that system every day in the year.

The lack of such a system is the reason that we have not received service from our highways in the past. We have never been able to impose a sufficient sense of responsibility upon the local communities, the local officials, such as the county board of supervisors to secure maintenance of the highways. You gentlemen who are used to driving largely over the highways will fol-

low the state roads and you will find, generally speaking, unless your highway happens to be afflicted with detours at that particular time, due to new construction, that the state highway system is in a good condition of maintenance, but on the roads branching off from it there is poor maintenance.

There is a distinct line between the state and the county authority. The county authorities, except in very rare instances, have never maintained their roads. They have never been willing to put a man on a stretch of road and keep him there and give him responsibility and make it his job to take care of that particular piece of road. With such maintenance as is required by the federal highway act we are going to be able to get adequate service out of the cheaper forms of roads. So estimates based on what has been done in the past are reasonably accurate, and the job can be done in 20 years at an expenditure of \$50,000,000 per year or in 10 years with an expenditure of \$100,000,000 from the federal treasury.

Now that would perhaps require us to raise more of the money from transportation, not as a tax, however, on transportation. If you consider that our estimates as to the investment in motor vehicles are somewhere near right at \$8,790,000,000, a 20 per cent. depreciation of the motor vehicle is over \$1,600,000,000 per year. I do not know how much of that depreciation we can prevent by improving the roads, but if we can cut the bill for repairs by \$600,000,000 that would be enough to pay our total road bill for last year.

We don't imagine that by better roads we can save the total depreciation on the automobile and I do not know just exactly how we are going to arrive at a fair division between the roadbed and the motor vehicle of the profits from transportation.

I said in the beginning that we were approaching this from rather difficult angles because the individual owns the rolling stock and the public owns the roads, and I don't know how we are going to get

the individual to sit on one side of the case as automobile owner and on the other side of the case as a part of the public who owns the rolling stock and divide fairly the profits due to highway transportation, which is made up of the automobile on one hand and the improved road on the other hand. But in some way we have got to divide the profits that accrue from this transportation between the roadbed and the automobile.

Perishables Large Factor in Truck Traffic Over Highways.

We have been making a study recently of the uses to which the motor vehicle makes of the Connecticut highway. We found, for example, that the Boston Post Road was carrying eggs for an average haul of 68 miles. We found an average haul of all commodities on that road something like 70 miles. That one road was carrying commodities figured at an annual value of at least \$15,000,000. The division was approximately only 14 per cent. to agricultural products and about 73 per cent. to the manufactured products.

Strange as it may seem, the heavier commodities you see hauled around the streets on motor trucks such as coal, sand, gravel and materials of that character, are not the commodities we find are hauled over the public highways. The commodities that go to the public highway on the long distance haul are the higher-priced, smaller bulk commodities in which time is an element. So that we find that predominating in the commodities that are hauled, not the heavy classes of commodities which go to the railroads, such as coal, ores, gravel and stone, but to lighter and more expensive commodities—butter for example.

We find on that one highway, 73,000 ton-miles of butter hauled annually. The haulage of eggs amounted to 79,000; of fruit to 161,000 ton-miles. That means that New York was sending up into that district, or that that district was sending down to New York commodities such as you eat, have on your table, fresh every day, butter, eggs, fruit, all commodities in which

time is an element. I think we all agree that with eggs, at least, time is an element.

Motor Vehicles Becoming More and More Allies of Railroads.

This census will be continued this summer until we are able to deny, I am positive, the fact that the railroad and the automobile and truck are competitors. That is, except with a very small margin.

To develop our present views with regard to these things which I stated a minute ago we have found to be untrue, has taken a great deal of research, and we are engaged now in studying on a very elaborate scale all of the elements which go to make up the physical characteristics of the highways, the highway surfaces and the highway supports or the subgrades under them. In that work we have enlisted in a national highway research programme as many of the colleges and universities as we can persuade to join. We are putting to work the engineering research plants and testing plants which have been developed at the universities and colleges and that work is being conducted in all parts of the United States—not only on the higher priced roads, but down through the South; for example, in North Carolina and South Carolina, upon the sand clay, the gravel and the top soil roads.

In California—and here is another thing that is not so—people say that the road of California have gone to pieces and that they have been gradually giving up the ghost. The bureau made a very careful survey of 1290 miles out of the entire system of about 1500 miles of concrete roads which have been built in California since 1909; that is a period of over 10 years.

In that 10-year period of the entire mileage that has been built, less than 13 per cent. is all that shows signs of distress or has been broken down. And those roads, gentlemen, were four and five inches thick and 70 per cent. of all which showed distress were laid over clay and adobe soils. It is my judgment that they would have shown about the same distress when laid over that kind of soil had they been very much thicker.

Flaps Essential to Tire Mileage

THERE is probably no part of a pneumatic tire as little understood or appreciated as the flap and yet its importance can hardly be overestimated by the driver of the pneumatic tired vehicle.

The use of a correctly designed flap, properly applied in the casing, will insure full and satisfactory service from the tube, while an incorrectly designed flap or improper application of the correct flap is certain to result in damage to tubes, casings and dispositions.

THE function of a flap is to protect the inner tube from injury by the bead toes and by the rim. This it does by forming a continuation of the smooth inner surface of the casing against which the inner tube inflates from a point above the bead, down across the rim and up to a corresponding height on the opposite bead.

The technical service department of the United States Tire Company in an authoritative statement places herewith at the disposal of tire users simple yet adequate information regarding the correct use of flaps.

In straightside tires for passenger cars the flap is supplied separately since it has been found that "cemented in" flaps such as are furnished in motorcycle tires sometimes work loose on account of the heat generated by these larger tires and become dislocated to such an extent as to cause tube pinching. The "floating" flaps supplied in all United States tires of straightside type are made of several plies of rubberized fabric and are covered on the tube side with a layer of canton flannel which is turned back over each edge and permanently vulcanized to the main body of the flap. The flaps are vulcanized into the concave shape they assume when mounted in the casing and are provided with a round hole in one end and a slot in the other to allow for proper length adjustment. Their edges are "feathered" and cannot chafe the tube.

To fit properly the flap must reach to a point on the inside of the casing approximately even with the top of the rim flange. If the flap is so wide that the edges come above this point, the flap edges have been known to cut into the casing, the tube following, resulting in a ruined tire. On the other hand, if the flap is too narrow there is great danger of one or both of these edges being folded under when the tire is mounted on the rim. This will quickly lead to tube pinching.

Tires are shipped from the factories equipped with flaps to fit those tires when mounted on rims with which they are most generally used. For example 33x4 tires are being shipped out with flaps to fit them on 32x3½ rims, for the reason that the 33x4 rim has been adopted only recently and there are far more 32x3½ rims in use than 33x4. As soon as this condition reverses itself 33x4 tires will be supplied with flaps to fit 33x4 rims.

Proper Application.

The necessity for using a flap in a straightside casing even when this casing is mounted on a solid base rim is apparent. All straightside tires are built with a rim clearance sufficient to assure easy mounting. The result is that when the tire is inflated on the rim the beads lift off the base an appreciable distance. Without a flap there is nothing to prevent the tube from being blown under the bead toes, and as the tire revolves and these beads move up and down the tube will eventually be pinched. In the case of a transversely split rim the tube will be pinched in the rim opening.

In applying the flap the end having the round hole must in every instance be placed over the valve first and the slotted end last, thus permitting the flap to adjust itself circumferentially. Failure to observe this procedure is almost certain to result in damage to the tube.

Care should be exercised to have the flap centrally and smoothly placed with respect to the beads of the tire when mounting on the rim.

A little attention and care at this point of assembly will repay the labor many times. In addition to seeing that the flap is centrally and smoothly placed with relation to the beads the inner tube should be slightly inflated. After assembling, pick up the tire and bounce it rather firmly at three or four places, the casing to be held in a vertical position. This will allow the flap and tube to settle into proper position and prevent the flap being left too high in the tire, where it is likely to remain unless the bouncing is resorted to. Continue this operation two or three times, each time inflating the tube (if necessary) until the flap is in its proper position in relation to the beads.

Attention should also be paid to the valve stem. No tire should be mounted unless the valve stem is seated in a free and straight position. No amount of inflating will straighten a valve stem if the inner tube has been assembled in a twisted position. A complete new start should be made to correct this condition, for if the tire is mounted with a badly twisted valve stem, the tube is greatly strained and trouble is sure to result. If one edge of the flap becomes folded trouble is almost sure to result. A flap which is too wide, if applied off center, is likely to fold over or to stand out so far from the walls of the casing as to permit the tube to be pinched.

Truck Flaps.

The United States truck tire flap is most scientifically designed and constructed. This flap is molded in circular form, of very heavy construction and is so shaped in cross section as to fit accurately between the beads of United States pneumatic cord truck tires when mounted on the rim. Its surface is covered with a lubricating composition, which preserves the surface of the tube. The ends of the truck flap are molded in such a manner that one end fits over the other at the valve without making any increased thickness at this point. A hole and

(Continued on Next Page.)



“WHAT’S on your mind to-day?” asked O. M. Vett, as I dropped into a convenient office chair and dropped my half-smoked cigar into a handy cuspidor.

“What makes you so solicitous as to my mind?” I countered.

“You look all stirred up, that’s all,” answered Vett with a grin. “Sort of warm and tired out—not to say dusty,” he finished.

“I’m all of that,” I said. “Been changing a tire out in the hot sun, and it isn’t the easiest work in the world either,” I explained, “especially when the darn thing is rusted onto the rim. But it’s back on again—though I won’t guarantee it’ll stay.”

“Why won’t it stay?” asked Vett. “I suppose you just slatted it on any way—the main idea being to get yourself in out of the sun—is that it?” he shrewdly guessed.

“That’s it,” I answered. “You must have had experience.”

“Yes—experience enough, I guess,” grinned Vett. “But that’s in the past tense,” he said, suddenly serious. “I’ve learned to put them on right within the last 10 years—and that goes for everything I do—whether its putting on tires or selling trucks. Though it isn’t exactly in line with your remark, I am reminded somehow by what you say of the advice I once heard an old carpenter give to his apprentice. The lad was one of those ‘beef-eaten’ kids—just bubbling over with health and strength. He and the old fellow had been shingling a school house roof one day and when it came time to quit the youth announced gleefully that he had laid an average of a bundle and a half an hour for the whole nine hours—they worked nine hours for a day at the time I speak of.

“The young fellow then asked the other carpenter how many shingles he had laid during the day. He told him and the boy laughed again because he had beaten the old fellow by four or five bundles. He then went on in the manner of youth to tell how he had worked, what he had done and detailed the exact manner in which he had accomplished the results. The old fellow listened gravely.

“Finally he said, ‘That’s all very well—but **how good did you** lay the shingles. **How many** is important—but **how good** is more important. When you get to be my age,’ the old fellow said, ‘you’ll find that a man don’t look at a job and ask you **how fast** you did the work. He’s interested only in **how good** did you do it.’

“That’s the trouble with a lot of young fellows these days,” concluded Vett. “They want to see how soon they can get a thing **accomplished without stopping to consider** the eventual result. Remember that when you have to change that tire again.”

I laughed—but just the same the next time I have to change a tire—or lay a carpet—or write a story—I’m going to bear the old carpenter’s advice in mind.

“HIGHWAY NOT JUST A ROAD,” SAYS VICE PRESIDENT GRAHAM.

GEORGE H. GRAHAM, vice president the Chandler Motor Car Co., says “Think of the highways for what they are,” and not simply as winding ribbons between farm lands, or as merely graded surfaces of clay, gravel, asphalt, macadam and concrete.

“The highway is not simply a road.

“It is assurance of the civilizing influence between sections. It is a silent but persistent factor for the reduction of living costs. It is a humble but powerful foe of ignorance, since it is usually the route to education. It is the safeguard of your food supply.

(Continued from Preceding Page.) slot provide for length adjustment. The edges of the flap are “feathered” by the mold so that they blend into the contour of the carcass and do not chafe the tube.

The same considerations as to fit and application as applied to passenger car flaps apply to truck flaps. In fact their importance is increased because of the highest inflation pressures and consequently the greater stresses imposed on the tube when its seating is not correct.

Pneumatic cord truck tires are shipped from the factories with flaps designed to fit them on their own size of rims. For example a 36x6 tire carries a No. 1 flap; a 38x7 a No. 4 flap; a 40x8 a No. 4 flap, etc. While the United States Tire Company does not advocate oversizing pneumatic truck tires without changing the rims, they recognize that it is being done and they, therefore, list flaps to take care of this condition. When a pneumatic cord truck tire is to be mounted on the next size smaller rim, it is absolutely necessary to exchange the flap furnished with the tire for the flap which will fit it on that rim.

There are other flap conditions not discussed that do not as quickly cause tube failure, but are nevertheless responsible for many of the motorist’s tire troubles. A flap that is poorly assembled and considered good enough is often responsible for a creased flap that later results in an endless amount of tube trouble.

Numerous cases have come to attention where the motorist was confronted with a seemingly endless amount of tube pinching trouble. Upon investigation they were most generally found to be due to either a deformed or a carelessly assembled flap. A flap is a most important component of your tire assembly.

William M. Stocker has been engaged by the Dickinson Cord Tire Corporation, New York City, as a designer of cord tire machinery.

Leigh J. Stephenson has accepted a position as chief engineer for the Stephenson System of Motor Control, Chicago.

Edward H. Strieder has been engaged as service man for the White Co., Cincinnati.

Operating Principle of the Four-Stroke Cycle Automotive Engine

HISTORY tells that four-stroke cycle principle, adapted to automotive engine, was first patented by Nicolaus August Otto of Dautz, Germany, on Aug. 14, 1877. This idea is still embodied in automobile, truck and tractor engines. The conception of compression and four cycles of operation was not, however, original with Otto. He combined these ideas into a practical engine. Twelve years were taken in their creation and three other countries participated in their evolution. The inception of the idea was in 1862, when a Frenchman, Alphonse Beau de Rochas, obtained a patent and wrote a pamphlet on the four-stroke cycle engine. Six years later Boulton, an Englishman, secured a patent covering the use of compression in an engine. However, Boulton failed to work out the necessary means for compression in a practical way.

The Automotive Engine.

Practically all automotive engines using gasoline or kerosene for fuel, are driven by explosions, which take place within the combustion chambers of the cylinders of the engine, and drive the pistons thus supplying motive power to the engine. These explosions are in a manner similar to the explosions of gunpowder or dynamite. When a charge of gunpowder is fired in a cannon or gun, the gunpowder burns and produces gases which expand and exert a tremendous pressure on the projectile forcing it from the muzzle of the gun with great velocity.

Practically any substance that will burn can be exploded under the proper conditions. An explosion is merely the burning of some material almost instantaneously resulting in a great amount of heat being generated simultaneously. When any substance burns, it unites rapidly with oxygen from the air. In order to have an explosion, it is necessary to have the fuel finely divided and carefully mixed with air, so that the burning can be very rapid. Then, if the fuel is ignited by an electric spark or other means, the flame instantly spreads throughout the mixture and an explosion occurs.

In a gasoline engine, gasoline vapor mixed carefully with air is taken in. This mixture is then exploded inside the combustion chamber at the top or rear of the engine cylinder. The force of this explosion drives the piston and the motion is transmitted through the connecting rod to the crankshaft. To make the process continuous and keep the engine turning, it is necessary to automatically rid the cylinder of the burned gases from the previous explosion and to allow a fresh charge to get into the combustion chamber ready for the following explosion. This process must be carried out regularly by the engine, in order to keep it running steadily.

It must be remembered that a cycle refers to the series of operations the engine goes through. In the four-stroke

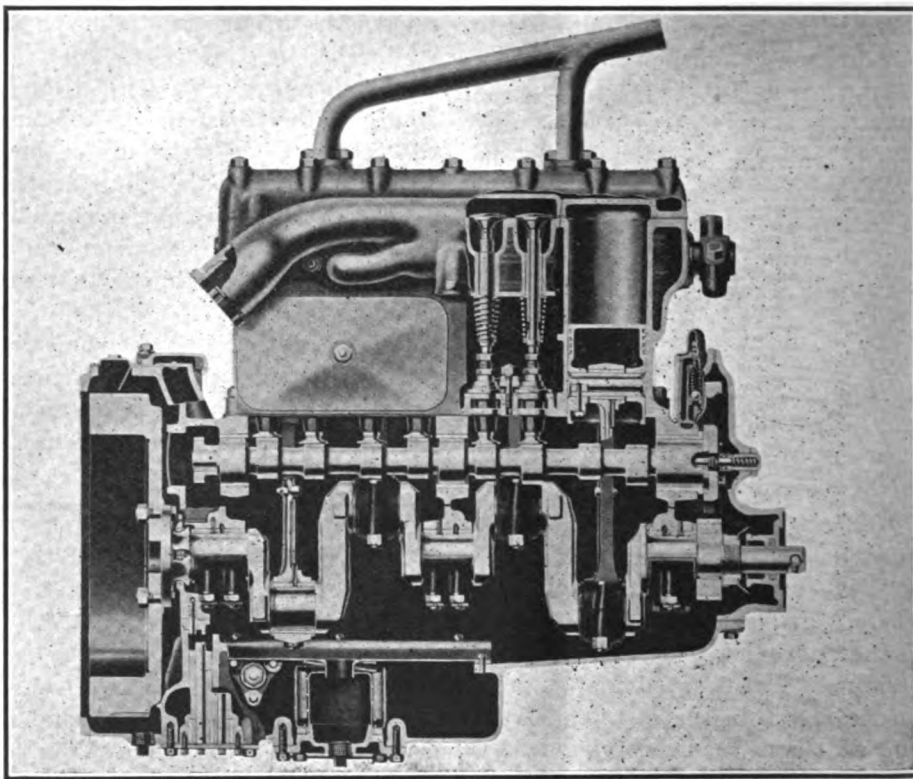
cycle four strokes or two revolutions are required to complete the cycle.

The Four-Stroke Cycle Engine.

Often the word "stroke" is left out and the engine is called "four-cycle". This might cause a misunderstanding as to just what a cycle really is. The better nomenclature is "four-stroke" engines and confusion will be avoided.

The illustrations, A, B, C and D, show an engine which operates according to the four-stroke cycle. This is a vertical L-head engine; that is, the cylinders are placed above the crankshaft (instead of at one side) and the piston moves up and down in the cylinders. This is the more

cylinder and receives the force of the explosion; the connecting rod, which transmits the force from the piston to the crankpin on the crankshaft; and the crankshaft, which is turned by the downward movement of the piston and by its momentum brings the piston back to its starting point. When the piston is at the top of its stroke, and the engine crank pin is also in its extreme upper position, the engine is said to be on its upper dead center. When the piston and crank pin are in the extreme lower position, the engine is on lower dead center. A four-stroke engine has a number of other minor parts, the function of which will be brought out later.



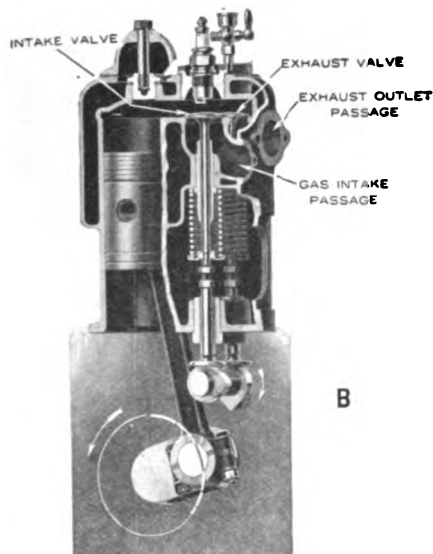
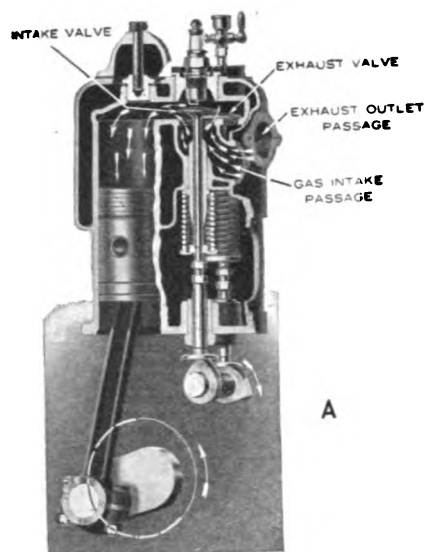
Continental Red Seal Engine Model J-4, 3½-Inch Bore, Five-Inch Stroke.

usual form of automotive engines in trucks and tractors although in many another type is used having the same four-stroke cycle but with valves located in the head instead of in the pockets at the side as in the L-head engine. This is known as the vertical I-head type.

In many of the older engines the valves were located in pockets on both sides of the engine, exhaust valves being placed on one side and inlet valves in the opposite pockets. This form is known as the T-head type, the valves being operated by two camshafts while in the L-head and I-head engines the valves are operated by a single camshaft.

An engine consists of four principal parts: The cylinder, which is stationary and in the top in which the explosion occurs; the piston, which moves within the

The engine shown in the illustrations, A, B, C and D, uses four strokes of the piston to complete the series of operations from one explosion to the next, and may be said therefore, to be typical of all four stroke engines. "A" shows the engine just beginning to draw in a mixture of gasoline and air through the intake or inlet valve. This is continued until the piston reaches the bottom of the stroke and the cylinder is full of explosive mixture. This operation is called the suction stroke. Then the valves are closed, as in "B", and the piston is forced back to its top position. This squeezes or compresses the gas into the space left in the top of the cylinder, called the combustion space. This process of compressing the gas is called the compression stroke. After the piston reaches



A—Suction Stroke, Inlet Valve Open Taking in Gas Mixture; B—Compression Stroke, Inlet and Exhaust Valves Closed, Piston Compressing Charge.

the top, the gases are ignited and burn so quickly that an explosion results and the piston is driven down again, as in "C". This is called the expansion or power stroke. When the piston reaches the bottom of the stroke, the exhaust valve is opened and, while the piston is returning to the top position, it forces out through this valve the burned gases which occupy the cylinder space. This is the exhaust stroke. The engine now continues to operate, repeating the same series of operations. A stroke means the movement of the piston from one end of the cylinder to the other; consequently, there are four strokes in the cycle of operations of this engine.

Advantages of the Four-Stroke Cycle Engine.

As compared with the two-stroke cycle type of engines, a fairly heavy charge of gas enters the cylinders due to the comparatively long period of the opening of the inlet valves. This is of great importance in high-speed engines, such as are used in truck and tractor operation as, even with the long periods, the intake becomes very short when the higher speeds are reached and much less gas enters the cylinders. Even in lower engine speeds it presents advantages. The cylinder retains its full volume of gas until after combustion occurs and the exhaust gases are forced out of the cylinders by the return stroke of the piston, during which time the intake valve remains closed and no dilution of gases occurs. Although some of the spent gases remain in the cylinders of a four-stroke cycle engine, the quantity is much less than in the two-stroke type and does not have much effect on the next fresh charge.

Multi-Cylinder Engines.

For small, moderate powers a single-cylinder engine possesses the advantage that it is of the simplest possible construction, is inexpensive to manufacture and maintain, and more economical in the use of fuel. Along with its advantages, however, it has two inherent defects, especially from the standpoint of its use in commercial vehicles, for which reason

it is seldom employed. In discussing the cycle of operations it was stated that the power impulses were irregular, due to the fact that the power stroke occurs every other stroke, or every fourth stroke and that the gases which are compressed in the cylinders require a certain portion of power to overcome them.

Therefore to keep the engine running at a fairly uniform speed against a nearly constant resistance it is necessary to employ a heavy flywheel in which some of the energy liberated on the power stroke can be stored, to be given out again during the idle strokes.

In a single-cylinder engine the entire reciprocating mass (that is, the piston with its parts, the connecting rod, bearing and crankpin), is in a single unit and the reaction of the inertia force of the parts produces a strong vibrating effect, while in multi-cylinder engines the reciprocating masses can be divided into several units and so arranged as to move in opposite directions, thereby neutralizing the effects of inertia.

The two-cylinder engine presents some advantages over the single-cylinder type.

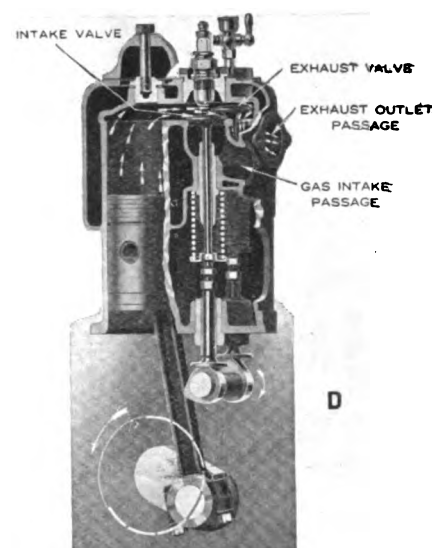
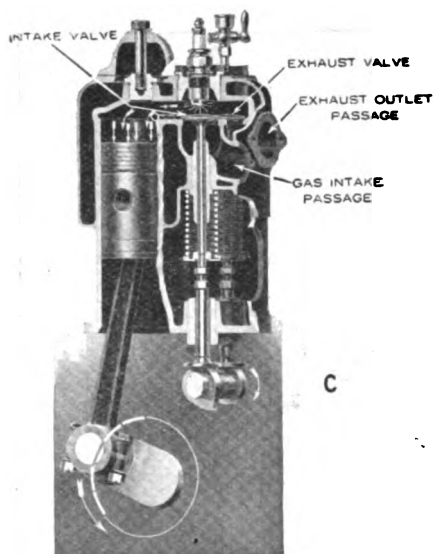
However, their use is also somewhat limited, and it is only a question of time until all commercial vehicles will be equipped with four-cylinder engines. The two-cylinder type presents an advantage over the single-cylinder in that there are two reciprocating masses, so arranged that the two inner work against the two outer masses. Although they are equal in weight, they operate in opposite directions.

The turning movement of a four cylinder engine is all so much more uniform than that of the two-cylinder engine, hence the torque reaction and vibration are much smaller. This four-cylinder type, when properly constructed, meets the requirements of vibrationless running quite satisfactorily.

Order of Events in Four-Stroke Engine.

The periods in the four-stroke cycle are seen in the illustration. This shows the two revolutions of a four stroke cycle so as to denote the crank positions when the different events occur. The diagram is drawn for a vertical engine with the crankshaft revolving to the right. This is the direction of rotation of an automobile engine to a person standing in front of the car looking toward the engine.

Assuming that the engine piston has reached the top of its stroke and has started back on its return stroke, the crank of the engine will also be moving down until at point A when the crank angle will be around 10 degrees, and the inlet opens. From A to B the suction stroke of the piston takes place, the inlet valve closing about 20 to 30 degrees past the lower dead center. The inlet valve has thus been open 180 to 200 degrees. From crank position B to crank position C, the gas is compressed, both valves being closed. From five to 10 degrees before the upper dead center is reached, the gas is ignited and the burning or combustion occurs from the crank position C to the crank position D, or during a period of from five to 10 degrees. The full force of the explosion is exerted just as the crank passes the upper dead center and the piston begins to descend.



C—Igniting Charge and Power Stroke, Inlet and Exhaust Valves Closed. D—Exhaust Stroke, Piston Forcing Burned Gas from Combustion Chamber.

From crank position D to that at E, the expansion of the gases takes place. At E, which is from 30 to 45 degrees before lower dead center, the exhaust valve opens permitting the gases to be exhausted while the crank is moving from E around to F where the exhaust valve closes a few degrees past the upper dead center, thus completing one cycle.

This description well illustrates the four-stroke cycle of a single cylinder engine, while for two, four, six, eight or twelve cylinder engines, the four-stroke cycle is the same and each cylinder of the engine is fired on this principle according to the number of the cylinders and their firing order.

Mechanism of Four-Stroke Engines.

The details and the mechanism of a four-stroke engine having four cylinders are shown in the illustrations. The cylinders are cast in one piece from gray iron, which is the usual material for cylinders. The gray iron flows freely when being cast, is easy to machine, and presents a good wearing surface to the piston. The water jacket around the cylinders is generally made a part of the cylinder casting, although some jackets are of copper and enclose the cylinder casting. The design of the water jacket is very important, especially in heavy-duty work, as sufficient cooling surface must be provided and all pockets where steam might collect must be avoided.

The cylinder head can either be cast solid with the cylinder or singly and made removable, being fitted to the cylinders by means of a copper asbestos gasket or ground joint and fastened by a number of steel studs. The removable head provides easy access to the cylinders for working purposes. The cylinder is made smooth inside by being bored out and is usually ground to size with a grinding wheel. The inside diameter of the cylinder is usually spoken of as the bore of the engine.

Pistons and Piston Rings.

The pistons which receive the force of the explosions and the resulting expansion of the exploded gases and transmits the motion to the connecting rod and

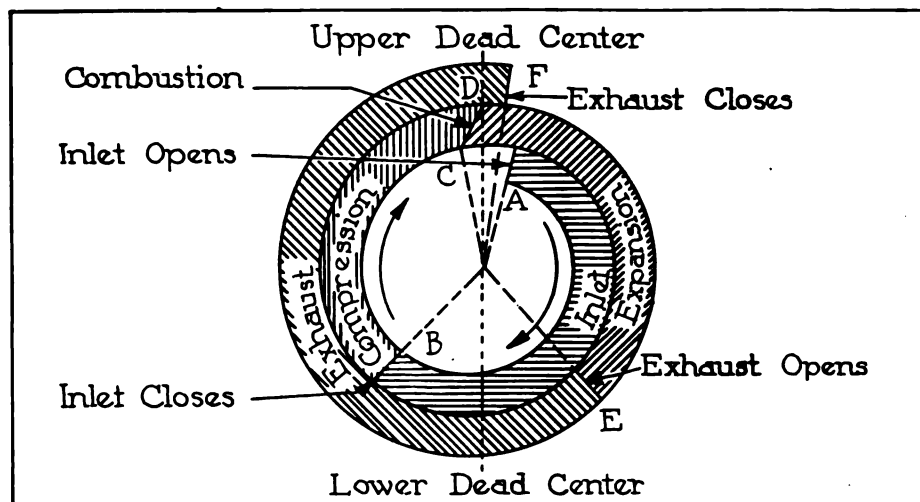


Diagram Showing Order of Events in Four-Stroke Cycle Automotive Engine.

crank are commonly made of soft gray iron, although some pistons are of aluminum and also aluminum alloy called lynite. The aluminum and alloy pistons have the advantage of being light, and it is also claimed that they radiate heat much faster than cast iron. Being lighter than cast iron, the aluminum or alloy piston is easier to move up and down in the cylinder. The expansion of these pistons is more than for cast iron and, consequently, a greater clearance must be provided when fitting them to the cylinders.

The pistons are turned and ground so that they will be a few thousandths of an inch smaller in diameter than the cylinder in order that there will be a good sliding fit without undue friction. The pistons are made gas tight by means of cast iron piston rings placed in grooves around the body of the piston. Ordinarily three rings, placed in the piston above the wrist pin, are used. In some cases an oil groove is also cut in the piston below the rings to improve the lubrication between the piston and cylinder walls. In still other engines pistons are fitted with a fourth piston ring below the wrist pin which acts as a scraper ring, preventing too great an amount of oil from the cylinder walls passing by the

pistons and fouling the combustion chamber and the top of piston. To still further obviate this, the lower edge of this ring groove is bevelled at the edge, $\frac{1}{4}$ -inch holes being drilled at an angle to allow excess oil to drain through the skirt of the piston and return to the engine base by gravity.

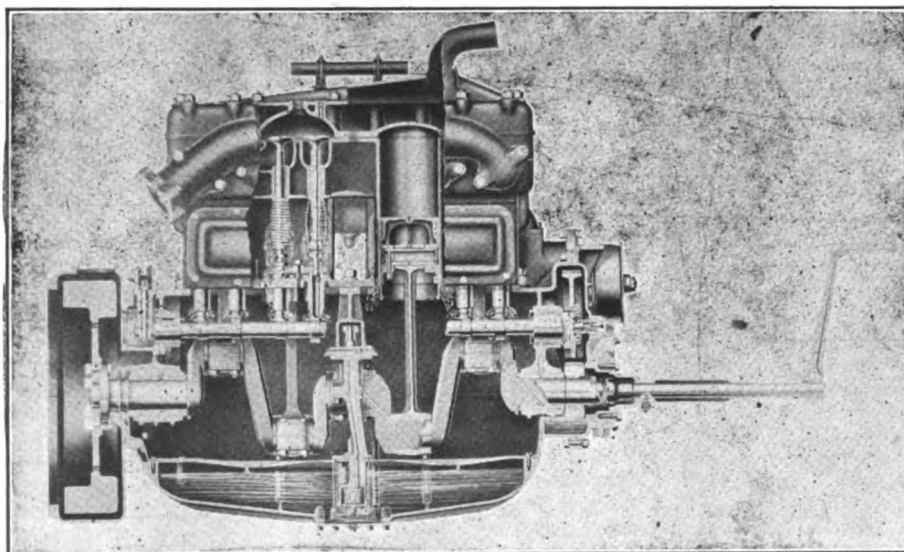
Piston rings are of two general types, the concentric and eccentric, the difference being that concentric rings are of uniform thickness, while the eccentric rings are considerably thicker on the opposite side of the opening. In addition to these types of one-piece rings, numerous patented and two-piece rings have been devised so as to combine the advantages of both the concentric and eccentric types.

The pistons used in truck and tractor engines are mainly of the trunk type, explosions taking place on one end only. The other end is open and allows free movement of the connecting rod. The length of the piston is usually $1\frac{1}{4}$ times the diameter. The head of the piston is commonly made flat, although occasionally pistons with slightly concave or convex heads are seen.

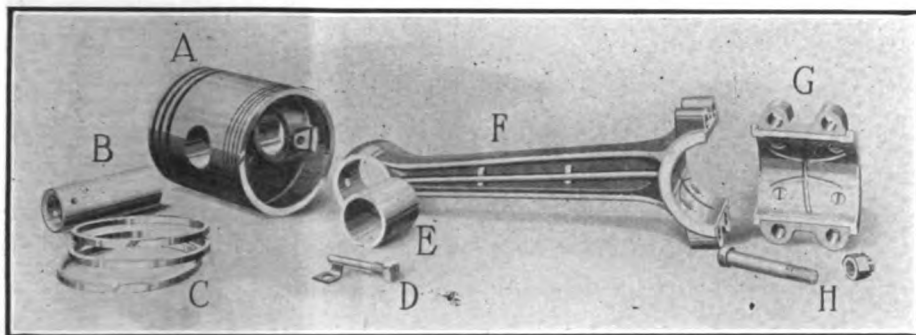
Connecting Rods.

The connecting rod may be either a forging or a steel casting and either solid or of I-beam section. The connecting rod is under compression at all times and the I-beam section is considered the best for withstanding the tendency of the rod to bend. The connecting rod is attached to the piston by means of a steel wrist pin. This pin may be clamped either to the connecting rod end and turned on a bearing in the piston or it may be clamped to the piston bosses and the connecting rod turn on the fixed pin. The bearing in the small end of the connecting rod is usually a bronze bushing forced on to the rod and then bored or reamed to size. The wrist pin is usually made hollow in order to reduce weight and to increase the outside bearing surface.

The lower end of the connecting rod turns on the crankshaft. One-half of the bearing is generally found in the rod itself, the other half being supported by the cap which is bolted to the rod. By adjusting these bolts, the wear on the bearing can be taken up from time to



Sectional View, Buda Four-Cylinder, Four-Cycle, L-Head Engine.



Disassembled Connecting Rod and Piston: A, Piston; B, Piston Pin; C, Piston Rings; D, Piston Pin Locking Screw and Retainer; E, Connecting Rod Bushing; F, Connecting Rod; G, Connecting Rod Split Bearing Bolt and Nut; H, Connecting Rod Split Bearing.

time. The shims are very thin pieces which are placed between the halves of the connecting rod bearing when the halves are tightened together by the bolts. As the bearing wears it may be taken up by removing some of the shims and then tightening the bolts. The bearing on the lower end of the connecting rod may be entirely of bronze or may be a babbitt bearing backed by bronze called sometimes a bronze shell. The babbitted bearing is much softer than the bronze and is much easier to fit. It wears more quickly than a bronze bearing and, consequently, needs to be adjusted oftener. Although the bronze bearing is more difficult to fit, it wears longer and needs less attention. Either type of bearing must have a little side play on the crank pin in order to prevent heating. The length of the connecting rod is from two to $2\frac{1}{4}$ times the stroke of the engine. It is desirable to have it as long as possible.

The Crankshaft.

The crankshaft turns the reciprocating motion of the piston and connecting rod into a circular motion. The length of the crank or the distance from the center of the crankpin to the center of the main bearing is one-half the stroke of the piston, the stroke being the distance the piston moves in one direction in the cylinder. A long-stroke engine is one on which the stroke is over $1\frac{1}{2}$ times the cylinder bore. The longer the piston stroke, the longer the engine crank must be.

When the crankshaft is running at high speeds, there are unbalanced forces set up and these tend to shake or jar the engine. To prevent this, many schemes have been devised for balancing these forces when running.

The Flywheel.

The purpose of the flywheel is to keep the engine running from one power stroke to another. In a single-cylinder engine, power is being delivered by the piston and connecting rod only about one-quarter of the time. Part of this power is stored in the flywheel and given back to the crankshaft and piston, during the other three-quarters of the time. It can be easily seen that a single-cylinder engine requires a heavier flywheel than a four-cylinder engine of the same cylinder size. As the number of cylinders is increased, the weight and size of the flywheel can be reduced. In a great many truck and tractor engines the flywheel and clutch are built together as a unit.

Valves.

It is necessary in a four-stroke gasoline engine that provision be made for getting fresh gases into the cylinder and the burned gases out. This is done by the use of valves, two of which are provided for each cylinder, one for the intake of gas and the other for the expulsion of exhaust or unburnt gases from the cylinder.

The prevailing type of valve is called the poppet mushroom—poppet from its operation, and mushroom from its shape. The valve seat upon which the valve closes is generally found in the cylinder casting, occasionally in the separable head casting of I-head engines, and sometimes in removable cages which carry the seat.

The best materials for valve heads are cast iron, nickel steel, and tungsten steel. Cast iron is comparatively cheap, easily worked, and stands corrosion well. It is weak, however, and a heavier weight is, therefore, required than with other materials. This weight is especially objectionable for high-speed engines. Nickel steel is strong, non-corrosive, and has a very low coefficient of heat expansion. Hence, it does not warp so readily as other metals. It is a rather expensive material and when used is generally welded to a carbon-steel valve stem. Tungsten steel is very hard and will stand high temperatures without pitting. The tungsten valve maintains a smooth tight seat for a long time while cast-iron valve seat will show pits and worn spots after a comparatively short period of use. In some makes of valves, cast-iron heads are fastened to steel valve stems with screw threads, the ends being riveted to prevent loosening in use.

The valve seats are usually bevelled to an angle of 45 degrees, though flat valves with flat seats are occasionally used. The valves must be large enough to let the gases in and out of the cylinders freely. If they are too small they will cut down the power of the engine by not permitting it to get a full charge. The valves usually measure from one-third to one-half of the cylinder diameter. Valve diameters are usually measured by the opening in the valve seat, often referred to as the throat of the valve. The diameter of the inlet and exhaust pipes should at least equal this valve diameter and should be larger if possible.

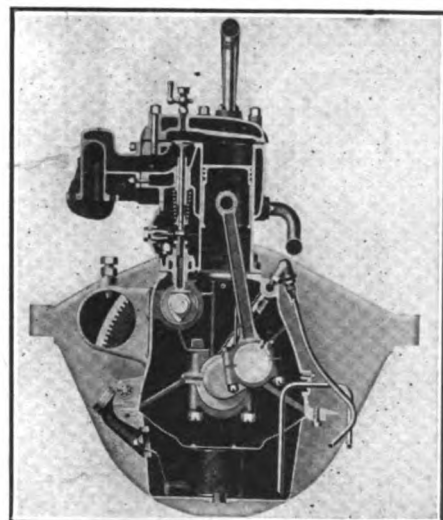
The valve lift, or the distance the valve opens, should, when possible be

sufficient to give the gases as large a passage between the valve and seat as they have through the opening or throat. For a flat valve seat this would require a lift of one-fourth the valve diameter. With a bevelled seat, the gases pass through an opening in the shape of a conical ring having a width of passage equal to about three tenths of the valve diameter. In most stationary engines this lift can be given the valve, but in high-speed engines it would be too noisy. This amount of lift would cause pounding and wear on the cams. It would require very stiff springs to make the valves follow the cams in closing and would be very hard on the valve seats and stems. For automotive engines the valves are made as large as possible and the lift is limited from five-sixteenths to one-half inch.

Any valve needs regrinding into its seat occasionally with oil and some abrasive that does not include emery in its composition. Exhaust valves require this more often than inlet valves, as they become warped and pitted by the hot gases. After a valve is ground in, the push rods should be re-adjusted, as the grinding will lower the valve and reduce the clearance in the valve motion.

Valve Operating Mechanism.

The form of mechanism for operating the valves depends somewhat on the valve arrangement. The valve arrangement, in turn, is determined by the shape of the cylinder head. The usual head arrangements are named from the shape of the combustion space of the cylinder. The T-head permits large valves and low lifts. It requires two valve operating mechanisms and two camshafts, one on each side of the engine. The L-head, with both valves on one side, requires only one camshaft. The L-head does not present so much cooling surface to the combustion chamber and is, therefore a little more economical in fuel than the T-head arrangement. The I-head arrangement has come into quite popular use because it gives a short, quick passage into the combustion chamber and also a simple, compact combustion chamber with a minimum loss of heat to the cooling water. The valve-in-



Continental Red Seal Model 7-R Six-Cylinder L-Head Type Engine Showing Connecting Rod Assembly in Position.

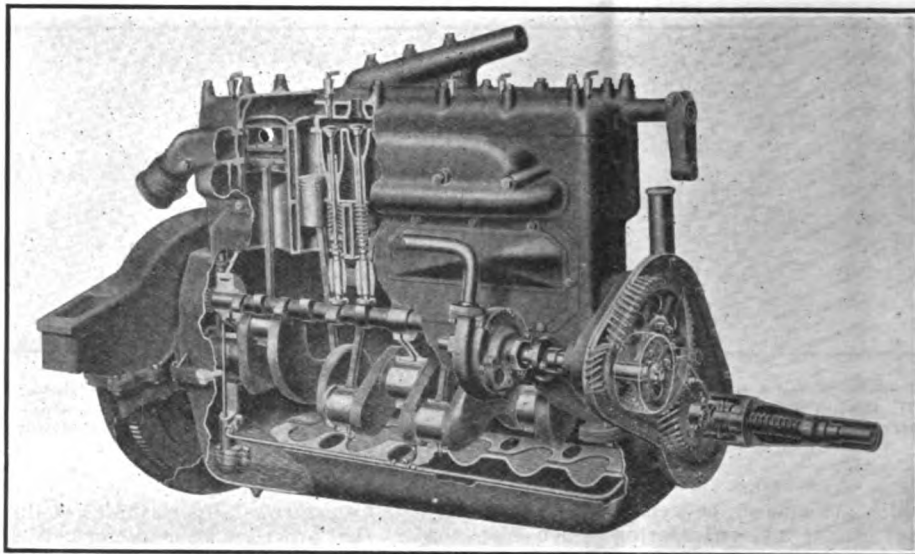
the-head arrangement requires that the motion of the push rod be reversed in order to operate the valves properly. This is accomplished by means of a rocker arm, both valves being operated by one camshaft. With a T-head or L-head valve arrangement, the operation of the valves is simplified.

The valves are operated by two push rods, one for each valve. These push rods receive their motion from the cams. On the lower ends of these rods are rollers or followers, and these roll or slide on the cams of the camshaft. These cams each have a hump or projection for about one-fourth of their circumference. When one of these strikes the roller or follower it raises it, and this motion is transmitted through the push rod to the valve. After the projection of the cam has passed under the roller, the valve spring will close the valve and force the push rod back to its original position. In order to allow for expansion and to provide for certain adjustments in the opening and closing of the valve, there is always a small clearance between the push rod and its follower when the valve is on its seat.

Valve Opening and Closing.

The exhaust valve of an engine opens, on an average, about 45 degrees before the end of the stroke, in order that the pressure may be reduced to atmospheric by the end of the power stroke, and also that there will be no back pressure during the exhaust stroke following. At the end of the exhaust stroke, the exhaust valve should remain open while the crank is passing the center so that any pressure remaining in the cylinder may have time to be reduced to atmospheric. The exhaust valve usually closes from five to ten degrees late (past dead center), having been open from 230 to 235 degrees.

The inlet valve very seldom opens before the exhaust closes. Most manufacturers do not open the inlet until the exhaust closes, for fear of back-firing, although there is little danger of this except with slow-burning mixtures. The inlet



Phantom View Herschell-Spillman Engine.

valve opens, on an average, 10 degrees late (after center). At the end of the suction stroke there is still a slight vacuum in the cylinder and the inlet is kept open for a few degrees past center to allow this to fill up and get the greatest possible quantity of gas into the cylinder. On the average, the inlet valve closes about 35 degrees late, depending on the piston speed of the engine. The inlet valve thus remains open about 205 degrees.

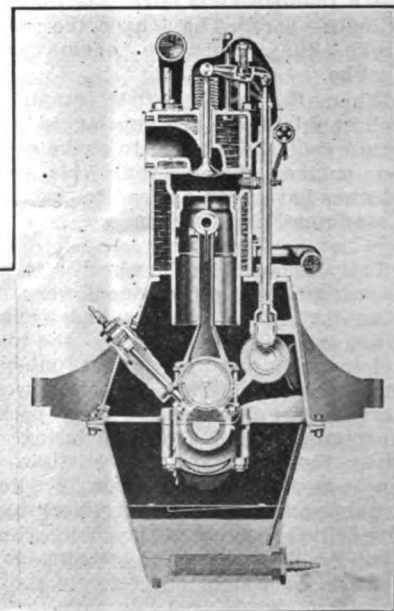
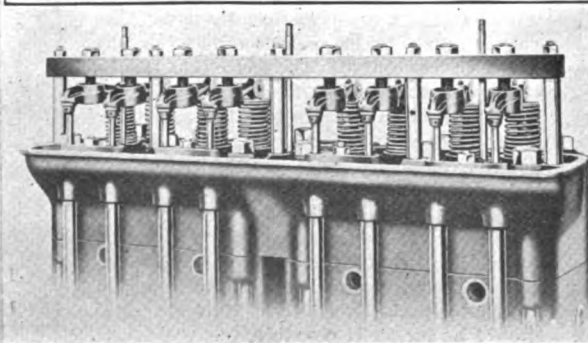
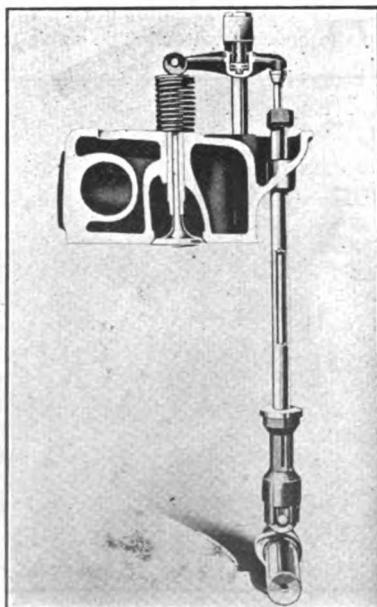
Use of Half-Time Gears.

Since the valves on an engine open and close but once in two revolutions, the engine must be arranged so that the cams on the camshaft come around and strike the cam followers only once in two revolutions of the crankshaft. To secure this a gear is put on the crankshaft which drives another gear, twice as large, on the camshaft. The camshaft thus will run at half the speed of the crankshaft. These gears are called half-time gears.

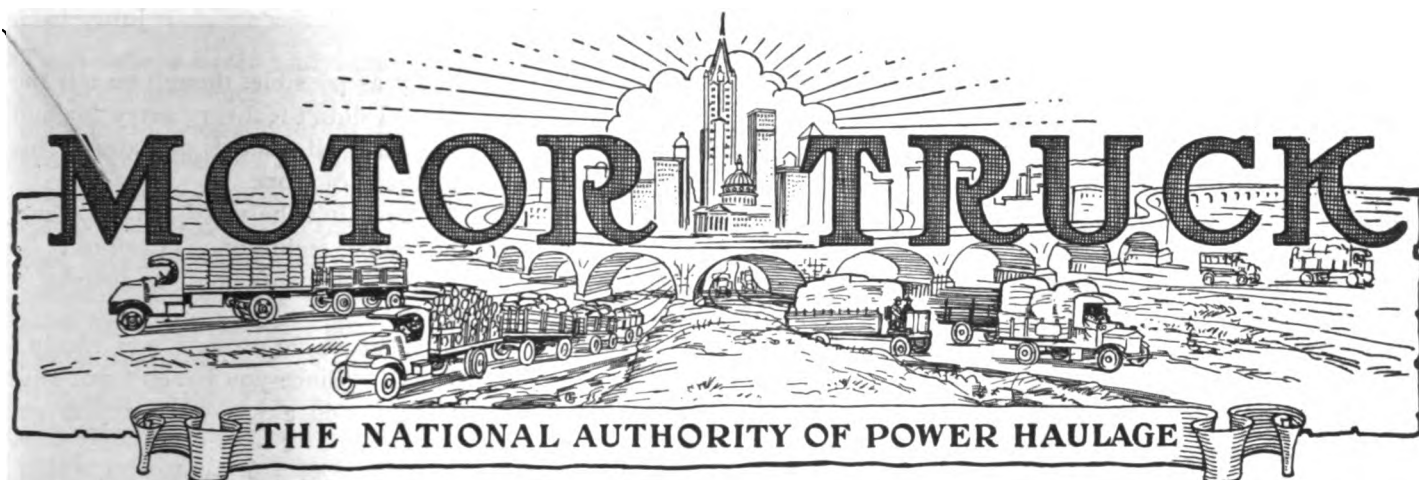
Plain spur gears with straight teeth, or helical gears with teeth at an angle, are the usual types of half-time gears. In some cases the positive connection between the gears is furnished by a chain drive similar to that on a bicycle. Difficulty is sometimes experienced with the plain spur gear on account of lost motion due to wear, and, with the chain drive, to an increase in length. These difficulties have to a large extent been overcome by the use of helical gears.

The Muffler.

When the exhaust valve of the engine opens at the end of the expansion stroke the pressure of the gas inside the cylinder is still about fifty to sixty pounds a square inch. The valve must be opened and this pressure let out before the piston starts back, or the back pressure will tend to stop the engine. The valve is opened quickly, and the high pressure, being suddenly released into the exhaust pipe, causes a sharp sound which is heard when an engine exhausts. This sound is not the explosion, as is commonly supposed. The real explosion takes place a little before and can be heard only as a dull thump inside the cylinder. The explosion occurs at the beginning of the working stroke, while the sound heard in the exhaust comes at the end of the stroke. In order to prevent this sudden exhaust from causing noise it is customary to have a muffler. This is a chamber in the exhaust pipe which receives the exhaust gases from the engine and allows them to expand them gradually into the outside air.



Overhead Valves Showing Operating Mechanism, Rocker Arm Support and Position in Midwest Engine.



VOL. XIII. NO. 6.

PAWTUCKET, R. I.

JUNE, 1922.

Intimate Hours with the Men Who Make the Wheels Go 'Round

Recounting a Short Series of Adventures, the Result of a Day Spent by the Diligent and Inquisitive Reporter in Search of Pertinent Information on Various Subjects

"TAKE a turn out into the 'byways and hedges' and see if you can't dig up some real trade stories," the editor told me.

"I'd like right well to find some good first-hand stuff," I answered, "but I don't believe there's a thing going on that will make even passingly good reading."

The editor scoffed at my answer. "There's always good stuff that a live man can get," he said. "Just start out of the office, take the first turn to the right, and then cross the car tracks in the general direction of the city. Turn in at the first motor truck agency you come to. You'll find plenty of material before the day is over for a group of short sketches," he promised. "We don't want long articles," he explained. "It's too hot to read biographies this weather—beat it and don't show up until you've got something good—something that will carry a readable and an understandable message."

"What do you think I am—a messenger boy?" I asked sarcastically as I dodged the empty inkwell that he tossed in my general direction. But I "beat it" as ordered and following

directions found myself in the office of a well known truck dealer whom I have known for several years. This man has a partner—him I know also.

"There's a man whom I call the most expensive salesman in this organization," said the truck distributor when I had handed him a cigar and we were comfortably seated, indicating a somewhat seedy looking individual who had just gone out of the office. Then, seeing my look of surprise he laughed. "Doesn't look very successful, does he?"

I shook my head. "No—to tell the truth he hasn't the appearance that one usually associates with success," I answered. Then trying to gloss over my somewhat abrupt remark, I went on in bromidic manner to say that one couldn't always tell how good a man was just by looking at him. "I've seen captains of industry who always seemed to have slept in their clothes," I said, "—collars worn at the edge, coat sleeves shiny and always needing a 'wash and a polish.' Why the richest man I know—"

"You're making it worse all the time," grinned the distributor. "To

tell the truth the man looks like a failure doesn't he?"

"Yes, he does—to tell the truth," I answered somewhat reluctantly.

"Well—that's just what he is," said my friend, then at my look of inquiry, "I said he was the most expensive salesman—not the highest paid. What I mean is that he costs the office more in lost sales and general dissatisfaction than all the others put together—and that makes him an expensive person to have around, even though his weekly pay envelopes may be the smallest of the lot," he finished, somewhat moodily I thought.

"Why don't you chuck him if he interferes more than he helps," I then wanted to know.

"Can't be done," grunted the dealer. "He's a fixture—my partner's brother," he explained shortly.

"Too bad," I said sympathetically. "It's hard enough to make sales in a business like way without having to put up with a blunderer who spoils even a small percentage of the good chances. There's one good thing though," I said. "You know he's no good—that helps, because you can keep him away from

the better class of customers and prospects."

"I wish I could," said the dealer.

"Surely you can—can't you?" I asked. "You have charge of the salesmen—don't you?"

"Yes," he smiled, and then, seeing my look of puzzlement—"unfortunately, however, this fellow isn't on the sales force—not in the strictest sense. **He's manager of our service department. And then I understood his ambiguous reference to lost sales.**

"The Best Salesman."

THE next man I called on, though a truck dealer for several years, is still as happy and care-free as though he had never seen the inner workings of one of the hardest businesses in the country.

"How's the best truck salesman in the world," I hailed him as I came abreast of his office and saw him industriously searching in the telephone book. "Put up the literature," I said. "It's foolish to look for a number for two reasons—the first, that you won't find it, and the second, that you won't get it even after you have politely asked the operator for it. 'The line is busy,' too."

He grinned and tossed the book onto a shelf.

"Part of your remark is right, anyway," he laughed. "But as for the best truck salesman in the world—well, the best truck salesman in the world is still doing business—I guess—though not as much as he might perhaps."

"Who knows better than yourself," I asked.

"Why—the answer to that is—anybody knows as well as I," he answered ambiguously.

"What's the idea?" I asked. "You know your own business best."

"But I'm not the 'greatest truck salesman,'" he protested.

"Who is—if you aren't," I inquired in mock seriousness.

"Service is the greatest truck salesman in the world," replied this modest man. "How do you like that answer?"

"It sounds all right at that," I agreed.

Another Chance.

THE next place toward which I turned my steps was a repair shop kept by a man who should be doing all the business he can swing to but who—for reasons obvious to one who has seen his place of business—does just about enough to enable him to live—or did up to five or six weeks ago—until he woke up. Now he's doing well. Quite as I expected this gentleman was reclining in a three-legged chair in front of his ill-kept shop.

He's a good natured sort of slob—one of those who likes a cheery word and will talk all day about nothing, and as I tendered the cigar—"taking advantage of the warm sun of late spring," I jibed (whatever that may mean)—what do you think you are, a fireman?"

"Wish't I was," he answered disconsolately, as he bit a couple of inches from the weed and placed the rest in his hat band. "I'd get steady pay at any rate."

"Business is bad?" I asked solicit-

ously as possible, though to tell the truth I didn't feel very sorry for him knowing all that I did about his methods of work.

"Bad ain't the word. It's rotten," he said, feelingly. "Couldn't be worse. Haven't did a job for a week."

"That ought to suit you nicely," I said. "Since you haven't got anything to do a job with if you got one to do."

"What do you mean," he challenged truculently. "I've got the regular tools haven't I?"

"Come on into the shop," I said. "We'll talk this thing over man to man and if you want to get mad—that'll be my hard luck. You're bigger than I am."

Somewhat reluctantly, as though impelled by curiosity, he followed me into dim recesses of the shop. It was anything but a place to inspire confidence. The cement floor of the building was littered with old grease and waste. Windows, by the look of them washed last when Abraham Lincoln wore his first pair of rompers kept out the bright sunlight of early May and were aided in their opaque effect by the webs of numerous spiders which were draped, as lace curtains in another place would have been, across the lights of glass.

The work bench—originally a mighty good one, built of oak planking, was cluttered up with a mass formation that ranged from a cast-off baby carriage wheel to what I at first thought was an old fountain syringe, but which was probably a piece of soiled red inner tubing.

SEWELL WHEEL USED BY DETROIT FIRM



Ten of a Fleet of 39 Trucks Equipped with Sewell Cushion Wheels Operated by Firm of Ira Wilson & Sons, Detroit.

Tools—there weren't any, unless an old Stillson wrench, a rickety hammer and three or four other items of miscellany could so be dignified. A vise minus a handle occupied one end of the bench and there was a bent piece of water pipe closely adjacent that appeared to have been used for a handle—a makeshift of the poorest kind.

"Some outfit you've got here, isn't it—or haven't you; choose the phrase you prefer," I said sarcastically, trying to awaken in him a show of fight. "Fine chance you'd have to do a job of work for a man."

"What's the matter with the outfit?" he challenged, suddenly getting hostile. "I'm as good a workman as there is in this town—ain't I?" he asked.

"You're as good a workman as there is in this town," I admitted. "I've seen you turn out jobs that would be hard to beat—in the old days when you first had this shop and before that when you worked for the ——— people."

"What's the matter then," he asked. And taking him literally I told him.

"The matter is you haven't kept up to standard. First you've advertised real truck service—but you haven't given it. You've kept customers waiting from day to day when they wanted to be on the road. You've got rush jobs and promised them for a certain date—and then gone fishing. You've told people that you had sent for a part when as a matter of fact you know and I know that the letter ordering the part wasn't even written. You're laid around in the sun down by the railroad depot pitching horseshoes when you had people waiting for their machines—In short, to answer your question—you're the matter—yourself. When you worked in the service station for the ——— people you were the best workman they had—and one of the quickest. Being your own boss has just about plumb ruined you."

He was silent for a moment. I expected him to whine—but he didn't.

(Continued on Page 306.)

STANDARD MOTOR BUS CONSTRUCTION PROPOSED BY AMERICAN ELECTRIC RAILWAY ASSOCIATION.

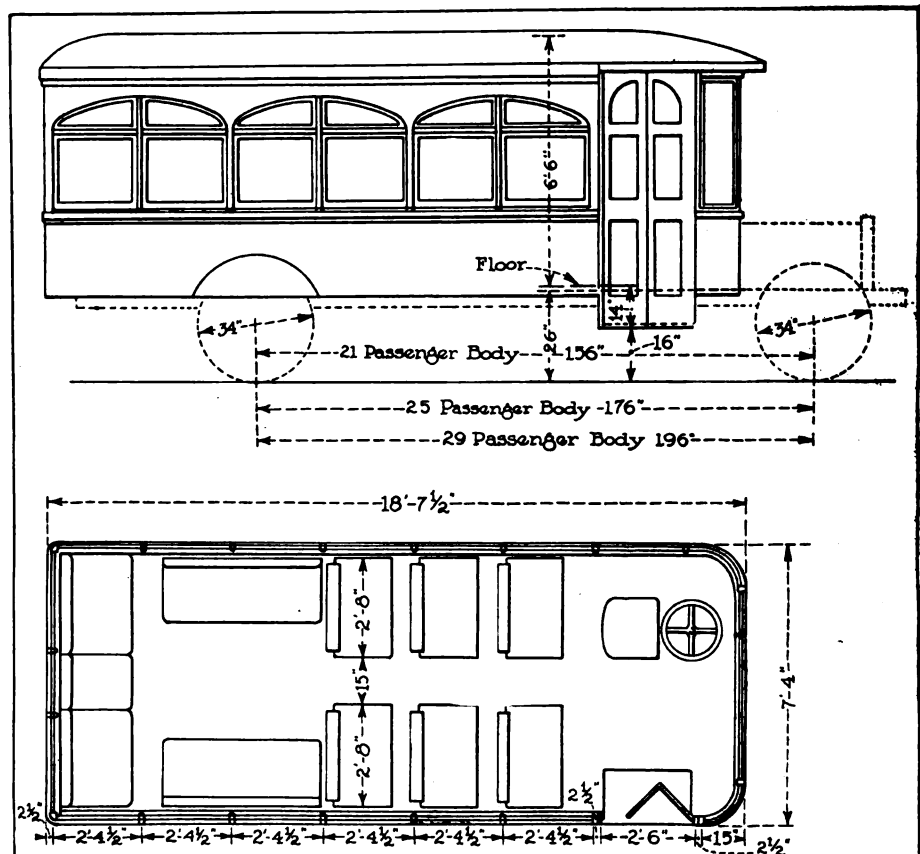
THE ENGINEERING Committee of the American Electric Railway Association has drawn up tentative plans for standard motor bus construction, as indicated in the attached statement. According to F. W. Fenn, Secretary National Motor Truck Committee of the National Automobile Chamber of Commerce, this development is felt to mark a definite effort on the part of street railways to enter the bus field.

The proposed dimensions for the three sizes of chassis are:

Number of passengers.....	21	25	29
Wheelbase (inches)	156	176	196
Engine (horsepower)	30	40	50
Tread, front and rear (inches).....	66	66	66
Capacity of rear (tons).....	2	2½	3
Braking Surface (sq. in.).....	150	175	200
Approx. maximum weight (lb.).....	4500	5000	5500

Other Recommendations are:

- Low-hung type of chassis frame with a maximum frame height of 26 inches, preferably lower.
- Spring suspension.
- Engine, preferably of either poppet or sleeve valve type, with maximum speed not to exceed 1300 r. p. m.
- Gear ratio not to be less than 7 to 1 and not more than 12 to 1.
- Metal plate or spoke wheels.
- 34-inch solid or semi-solid tires; pneumatics where low floor height not desired.



Single Deck Bus Proposed as Standard Design by Engineering Committee of American Electric Railway Association. (See Text Above.)

Los Angeles Children See Snow for First Time When Transport Truck Distributor After Trip to



Nearby Mountain Produces Four-Ton Load Together with the Conventional Show-Man.

TRUCK BRINGS THE "MAKINS"

TRANSPORT TRUCK COMPANY has received an interesting story of how a Transport truck driven by L. P. Poyer of D. F. Poyer and Son, Los Angeles distributor, came down from Forrest Homes recently with a load of snow for the Am-

bassador Hotel children and the older guests as well.

Native born California children flocked from all parts of Los Angeles to see a real, honest to goodness snow man. Most of these youngsters had never seen snow before.

A LARGE and robust snow man was built, with hat, gloves, pieces of coal for eyes, stones for buttons and last, but not least, a pipe in his mouth—and the children went wild. There was plenty of snow left over for snow balling, as the 2½-ton Transport brought down four tons of the "new white coal."

The children attending the school at the Ambassador hotel were given a half holiday to indulge in the eastern joy of snow.

This brings into realization the progressive age in which we are living, when a modern hotel can import snow down from the mountains, but this only can be done by the great advance in fast truck haul-

ing, such as was delivered by the Transport in bringing this snow in absolutely perfect condition from Forrest Homes, 90 miles away, in less than five hours.

While driving through towns, pedestrians were dumfounded to be bombarded with snow balls and great interest and much amusement was aroused.

A MOUNTAIN OF GLASS

EVER hear of a mountain of glass? Or a glass road? No, this isn't a yarn about a glass pyramid in the rear of somebody's bottle factory, nor a story of a broken bottle road police trap for speeders. A mountain of solid glass was the biggest problem confronting the construction engineers who built the magnificent road system which is one of the finest artificial features of the Yellowstone National Park.

HOW they solved the problem by methods hitherto unheard of in road construction is one of the most interesting freak stories in the history of roadmaking.

When the special geological report of the scientists attached to the United

States Geological Survey was submitted to the United States government engineers, before construction work was started, nothing very remarkable was noted, except the statement that for ¾ of a mile along the proposed river route there was a seemingly impenetrable mountain of glass running sheer down to the river.

Road construction was started in other parts of the immense domain, while the engineers prepared to attack the mountain, which was really a survival of the cretaceous and subsequent tertiary periods in the history of the Yellowstone, whose story goes back to the first cooling of the earth's surface.

Giant blasting powders and heavy charges of dynamite were used, with as little effect on the adamant glass wall as a wooden mallet. Finally, when all the usual methods had failed, a surveyor with the engineering party, who had formerly been a glass blower, suggested heating the mountain and spraying it afterwards with water to make it dis-

integrate.

Since the standard methods had proved unsuccessful, the engineers were inclined to think this idea might be practicable. Accordingly great logs were hauled and piled along the base of the mountain, and fires started along the ¾-mile section of the proposed route.

Energetic crews piled logs on the fire for several days, and after the desired heat had been registered, the intrepid engineers directed the spraying of the mountain face with water from the river below.

The entire face of the mountain exploded in huge chunks, the deafening reports being heard for many miles. The experiment was a complete success. About half of the space was cleared and after another trial they had room enough for a Roman chariot race.

The chunks of glass were found to be admirably adapted for road building, so they were used as the base, with the smaller pieces on top, the combination making a fine road.

Sees Auto Truck of Future Made From Sand

MOTOR trucks, skyscrapers, ships, locomotives, cannons and everything else, now fashioned from steel, will be made of common clay or loam in a few years, according to John S. Unger,

Research Engineer of the Carnegie Steel Company. Mr. Unger sketched his ideas of a complete revolution in steelmaking while attending a meeting recently of the Iron and Steel Institute of America.

A COMBINATION of silicon, aluminum and iron, the three constituents of common clay or loam, will replace steel for hundreds of uses within the next quarter or half a century, is his belief. He said the experiments in the laboratories of the Carnegie Steel Company showed that a light synthetic metal could be produced to do the work of iron and steel.

Structures like the Woolworth Building might be run up when the "neosteel" is in use, with skeletons not much heavier than bamboo, according to his view. The applications of this promised substance to warfare would be unlimited. A soldier driving a light synthetic flivver could wear a suit of synthetic steel as thick as light armor-plate, without being crushed by the weight. Ten-inch guns might be carried around like logs, and the present dirigibles supplanted by flying forts of new steel.

"I believe," said Mr. Unger, "that the metal of the future will not be iron, but a composition, the chief components of which will be aluminum, silicon and iron—known ordinarily as common clay or loam."

Silicon is one-fourth as heavy as

iron. The lightness of aluminum is well known. Being mixed with iron and properly treated, this combination will form a substance which can be used in cables, or beams, or rails, as steel is now, according to the research engineer. Besides having the advantage of lightness, the substance is non-corrosive.

"This will answer the two great objections to all steel products," he said. "First, they rust easily; and, second, in accordance with the Irishman's statement, 'they are too heavy for their weight'."

The big drawback to the development is the fact that it is difficult to reduce silicon and aluminum for their oxides.

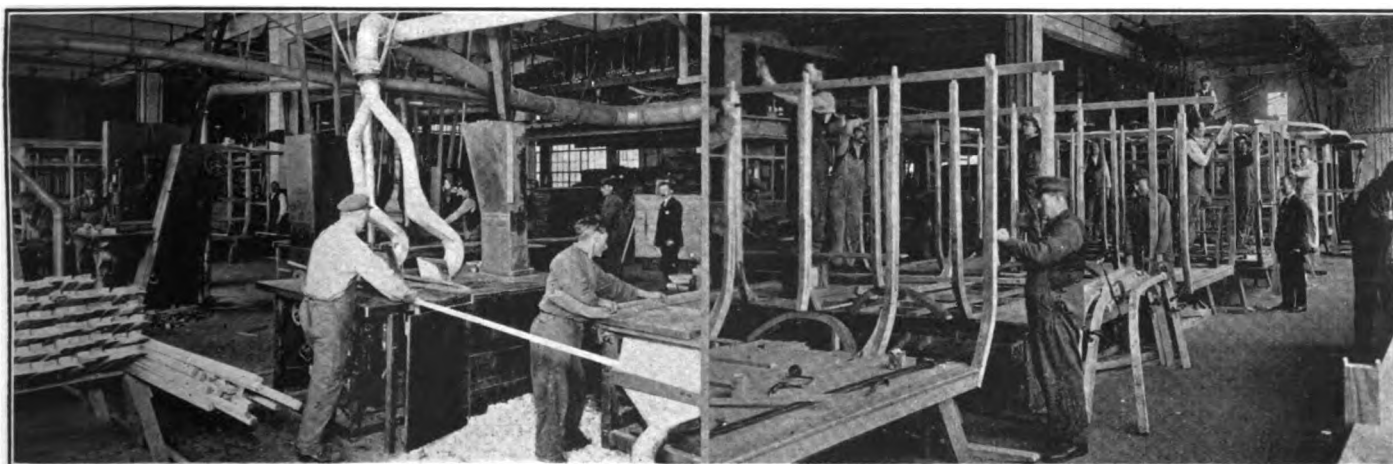
But the increasing use of steel makes it essential that some substance be found in unlimited quantities, it is said. The whole business of steelmaking will be turned upside down before the day when the new steel comes into use if Mr. Unger's expectations are borne out. One of the first of the economy measures would be, as he prophesied it, to deliver coal like oil, by piping systems from the mines to the furnaces. The coal would be delivered

from a pithead to a pulverizing mill, crushed to powder, forced into pipes and carried by water to the mill district and there dried out and used.

He expects ore to be delivered in big steel barges, but not unloaded by the present devices. "The barge of the future, with a 10,000-ton load," he predicted, "will be floated into a drydock, where it will be turned upside down and shaken out, the whole operation requiring less than half an hour."

The big monoliths of industry, the great stacks of the blast furnaces which disgorge fire and rolling smoke into the sky around Pittsburgh, will all disappear and be replaced by furnaces not more than twenty-five feet in height. This change will come to pass in a decade or a quarter of a century, when the price of oxygen has been reduced from \$160 to \$10 a ton. The use of oxygen to speed combustion will so increase the efficiency of ore reduction that the ore will be fed into the furnace in a continuous stream and the molten metal issue forth from a tap in a continuous stream, doing away with the tedious "make-ready" for the ore-blasting process, and thus saving valuable time.

BUILDING BUS BODIES



This Body Building Shop of the Fifth Avenue Bus Company Contains Every Facility for Efficient Work.

MAY ENFORCE USE OF ALCOHOL

CONSUL Wesley Frost, at Marseille, reports to the Department of Commerce that the French government is contemplating the enforced use as motor fuel of a new mixture composed of alcohol, gasoline, cyclohexanol and phenol, partly in order to dispose of great accumulations of alcohol and partly to reduce the country's dependency for mineral oils on the United States, Great Britain, and Holland. As a result of extensive experiments a "carburant national", as it has been called, has been developed, the practical value of which is claimed to have been proven by tests. The formula is—Gasoline 900; Alcohol at 95°, 100; Cyclohexanol 17.5; Phenol 37.5.

VARIOUS interests have been attempting to find an assured market for the alcohol distilled from sugar beets, surplus wines and vegetable products. The quantities of such alcohol produced in any year fluctuate, and the

growers would like to be assured against over-production by an arrangement which would always enable them to convert their surplus into alcohol at remunerative prices. The solution, which has been hit upon for disposing of the excessive stocks of alcohol and providing a regular market for alcohol in the future, is the enforced use of alcohol as an adulterant of gasoline.

The difficulties have hitherto been that the price of the alcohol has been somewhat higher than the price of gasoline, so that the resultant mixture would be somewhat more expensive than gasoline. Under the terms of the Beziers Concordat, the French Government would establish a national alcohol office possessing a monopoly of the purchase and sale of alcohol; and this office would produce the carburant national. It would be subsidized by a tax of one franc per hectoliter on all wine marketed in France, and of 50 centimes per hectoliter on all cider marketed. It is

claimed that the resulting funds could be used to reduce the price of alcohol to such an extent that consumers of the new mixture would not suffer financially. It would thus appear that the wine and cider consumers of France would ultimately pay in the shape of a slightly increased price of wine for a subsidy, which would keep the alcohol industry afloat, and would diminish, by at least 10 per cent., the French importations of gasoline.

The movement appears to be politically very strong, and there is said to be a possibility that legislation will be enacted which will result in the replacing of gasoline throughout France by a mixture containing 90 per cent gasoline and 10 per cent alcohol. The weakest point in the project seems to be the amount of the wine tax which would be necessary to reduce the price of alcohol to a level with that of gasoline. The contemplated tax might not yield a sum sufficient to provide the subsidy.

TRUCK REPLACES STEAM ENGINE

RATHER than do away with their service entirely, as many have done, because their line was operating at a loss, officials of the Oil Fields Short Line Railroad of Oklahoma decided recently to motorize their equipment. Instead of using a steam locomotive to haul a mixed train, they now operate an FWD car, made by Four Wheel Drive Auto Company, Clintonville, Wis., over their eight mile run and have cut their operating and maintenance expenses to the minimum.

THE OIL Fields short line railroad operates between Dilworth, a small town in the Oklahoma oil fields, and Clifford, Oklahoma, where it connects with the St Louis and San Francisco Railroad.

The FWD rail car is equipped with a passenger body capable of

accommodating approximately twenty four passengers. The car is equipped with M. C. B. couplers, front and rear, so that when it becomes necessary to haul freight, a box car or flat car may be coupled on and hauled on one of the regular passenger runs. Regular schedules are maintained and, though this short line is now operating at a profit instead of a loss, patrons of the line are afforded just as efficient service as was formerly given.

The accompanying illustration shows the car equipment at present used and the motor equipment which was just recently adopted.

CONSTITUTIONALITY OF LAW QUESTIONED.

DETROIT, MICH., June 14.—The jitney drivers of this city have entered a combine to fight the proposed city ordinance that would drive them from the main streets if enacted. The two jitney bodies, the Red Star and the Blue Ribbon jitney line, have raised a defense fund.



FWD Operates Economically in Place of Engine on Eight-Mile Run.

Legge Heads International Harvester

AT A meeting of the board of directors of the International Harvester Company, held June 2 to elect officers for the ensuing year, Alexander Legge was unanimously elected the company president.

Mr. Legge has been connected with the harvester industry for more than 30 years. He made his start as collector of farmers' paper, selling agricultural implements on the side, in 1891, in the Omaha branch of the then McCormick Harvester Company. In 1898 he was a branch manager.

A FEW years before this Harold F. McCormick, then a youth just out of college, set out to learn the business. Mr. McCormick went first into the machine shops of the then McCormick company, where he remained for a time learning this end of the industry. Later he went to the Council Bluffs office, a student of collections and salesmanship, and it was here he met Alexander Legge.

The two men soon became warm friends—a friendship which has weathered the years. Mr. McCormick returned to Chicago in 1897 and in 1898, about a year later, came Mr. Legge's appointment as branch manager at Council Bluffs. In 1899 he was called to Chicago and made manager of the collection department of the old McCormick Harvester Company.

From this time on Mr. Legge's

ALEXANDER LEGGE



Identified with the Harvester Industry for More Than 30 Years the Newly Elected President of the International Harvester Company Has an Unusually Complete Knowledge of the Different Phases of the Business. He Is Self-Educated.

advance was rapid. In 1902, when the International Harvester Company was formed through the consolidation of the McCormick company, the Deering company and a number of smaller concerns, Mr. Legge was appointed assistant manager of domestic sales.

In 1906 came his appointment as assistant general manager of the International Harvester Company; and in 1913 he became general manager. He was appointed vice president and general manager in 1919, the position he has occupied up until his election as president the other afternoon.

Mr. Legge is self-educated; his schooling amounted to a few years in the elementary grammar grades. Yet his associates say of him that there is probably not a "finer economic brain in America today than his."

Said Harold McCormick: "The company is singularly fortunate in having such a man for its president. His great ability, faithful service and unbounded loyalty and zeal made it a pleasure to serve with him in the business of the company."

Chevrolet Truck in Canada

IN LINE with the always easily proved statement that the automobile is a real help in almost every kind of business is the report of the cooperation furnished by a Chevrolet one-ton truck in the Canadian wheat fields.

L. A. Coupal, who lives near Sedley, Saskatchewan, and has 2,560 acres of land under cultivation, has replaced four teams of horses, their wagons and drivers with his small truck, does all his grain haulage and selling himself, and knows how he stands every time a truck load of grain is delivered. Under the former system of operation with teams, each team averaged two trips a day, 15 miles for the round trip. The truck makes nine round trips daily. The smallest load carried is about 2,600 lbs., or 65

bushels, and the largest is about 3,060 lbs. or 77 bushels.

While the average load is seen to be well above the rated capacity of the truck, the little Chevrolet has made no complaint, nor has it required any expenditure to speak of for repairs. Mr. Coupal, who is a "bookkeeping farmer," estimates that the cost per bushel of hauling grain in the light truck is 1.7 cents, considerably less than by team. In addition to the advantage of lower bushel cost, the time element has been reduced from seven or eight weeks to about a month's steady hauling.

Mr. Coupal owns two tractors and a separator and does all his own threshing, handling and marketing of about 15,000 bushels of grain at harvest time. Total mile-

age in handling the grain to market was 133 and was covered on 10½ gallons of gasoline, at the rate of 12 2/3 miles to the gallon. The truck required only one pint of oil for the distance traveled.

In order to expedite loading the truck, Mr. Coupal took one of his old wagons, with a truck body, and mounted an extra truck body on top of that so that the bottom of the upper body was above the top of the Chevrolet's body. The grain spout fills the old wagon body while Mr. Coupal has gone to town with his truck load of grain, and when he comes back at the end of a little over an hour, the small sliding door at the bottom of the wagon body is opened and the motor truck body is filled in four minutes.

Automotive Markets Abroad

AN ENGINEER of Cjovik has just completed satisfactory trials with his new car constructed for running on snow, says Consul General Snyder, Christiana, in a report to the Automotive Division of the Department of Commerce. The driver occupies the rear seat with the engine between him and the passenger in the front seat. The car is intended to haul a sled with additional passengers. The car is one meter wide with a wheel track of .80 meters for use in country lanes, and the front skategliders are replaceable by wheels for summer use. The engine is a specially designed air-cooled type and all who have tested the car are greatly satisfied with it.

A RECENT survey of the British automotive industry by the American Trade Commissioner's office in London shows that it is still adversely affected by the engineering dispute. A few firms have abandoned the lock-out rather than lose such temporary seasonal business as awaits them, but this is far from being the general action of the motor manufacturers. The temporary pressure from the home trade still continues. Overseas markets have not opened out in any direction. The shortage of production has caused a boom in the price of post-war second-hand cars and it is believed that prices will shortly approach those in effect for second-hand vehicles after the armistice in 1918.

Trailers Not Much Used in France.

The use of trailers is as yet undeveloped in France and no statistics as to their number have been collected, says Commercial Attache Huntington. French military authorities placed large orders for trailers near the end of the war, but when the war soon ended these were left on the hands of manufacturers and they have not yet disposed of them.

New Motorcycle Factory Opens in England.

The Raleigh Cycle Company's new factory at Lenton, England, built at a cost of \$1,250,000, was recently opened by the British minister of mines, according to a report from Consul Hitch, Nottingham. The complete factory is said to be the largest in the country and will have a maximum annual capacity of 10,000 motorcycles, 50,000 counter-shaft gears for motorcycles and 100,-

000 gear cases, in addition to 100,000 bicycles and 250,000 three-speed gears for bicycles. Something like 5000 people will be employed in the complete factory when running at full time. About 2000 are now employed.

German Competition Not Serious in the Netherlands.

Consul General Anderson, Rotterdam, states that in spite of the increased imports of automotive products from Germany during the first quarter of 1922, as compared to the same period in 1921, automobile agents in the Netherlands generally indicate that German cars are not popular and that competition in the future is not likely to be serious.

The United States was also able to recover some of its export trade with the Netherlands. Germany supplied 388 of the 652 passenger cars, valued at \$807,092, imported during the first quarter of 1922, as

compared to the 148 furnished by the United States. Of the 302 trucks imported, valued at \$230,010, Germany supplied 289, France 9, and other countries 4. However, the United States furnished 100 of the 145 truck chassis imported as compared to 30 supplied by Germany, the large imports from Germany may be accounted for by contracts made last year, which Germany has not been able to fill until the past few months.

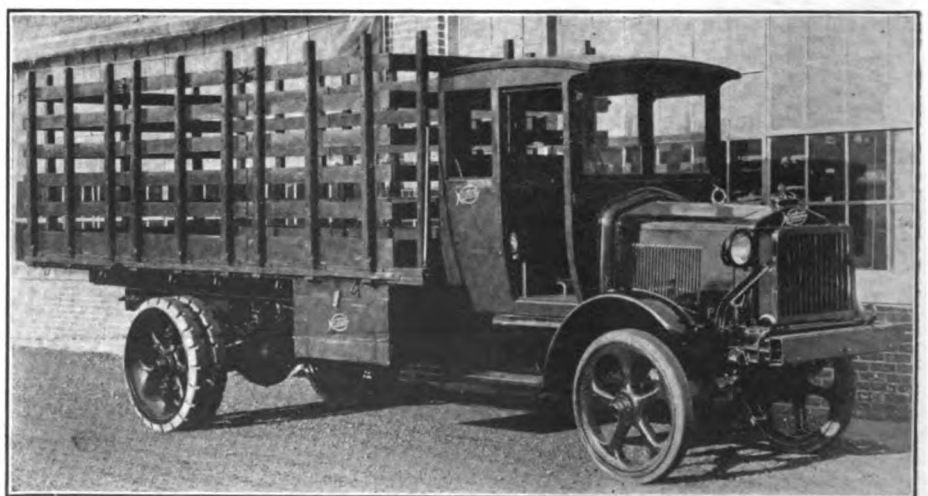
New Motor Road at Antung, China.

The Chinese authorities of Antung plan to build a six-mile motor road to Santaolangtong, the seaport of Antung, for the purpose of bringing cargo up to the city without lighters. When this road is completed a small demand for motor trucks is certain to arise, according to a report from Vice Consul Lasseter. There are no dealers in motor vehicles in the Antung district.

German Automotive Exports Decrease.

The exports of automotive products from Germany decreased nearly 40 per cent, as compared with exports during January, 684 passenger cars, motor trucks and chassis having been exported, according to unofficial reports received by the Automotive Division of the Department of Commerce.

Northway Adds to Line



Massachusetts Concern Now Headed by the Well Known Designer, Said to Be Building Truck for Every Need at Modern Bay State Plant.

Walker Light Electric Truck

THE Walker Vehicle Company of Chicago announce the addition of a new light delivery model to their already complete line of electric trucks. The low price of this newly designed acquisition puts it within the range of all light delivery car users, such as bakers, launderers, grocers and depart-

ment stores, states the manufacturer. This model is said to be economical, simple, clean, odorless, cool, noiseless, reliable, easily operated, long lived, cheaply insured, as it has no inherent fire or other hazards. It is said to operate very efficiently and economically in crowded city traffic, giving very dependable service.

THE truck is decidedly imposing in appearance and with its clean, silent power affords an excellent traveling billboard for any firm's name, besides making deliveries on city routes at a low cost.

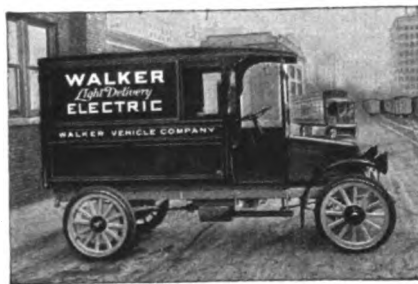
Channel section pressed steel, which is securely braced and riveted, composes the frame of the truck. It is so well constructed that the load allowed, when the battery and body weigh 2000 pounds, is one-half a ton. The frame is supported by semi-elliptic chrome vanadium steel springs. The material used in the manufacturing of the springs is well known for its strength and ability to stand up under strenuous duties, as well as for its superior resiliency and long life.

The front axle, with its knuckles and arms are high grade drop forgings. Friction with its attendant disadvantages has been eliminated to a great extent by equipping the truck with roller bearings, both front and rear. The rear axle contains a single reduction, heat treated bevel gear, the bearings of which are also equipped with roller bearings.

The chassis is furnished with artillery type wood wheels, having pressed on solid tires; those in front being 32 x 3 inches, while the rear ones are 32 x 3½ inches. Steering the vehicle is adequately cared for by a Ross fore and aft type steering mechanism. The rear wheels are equipped with two sets of brakes having a large working area and capable of bringing the truck to a standstill in a remarkably short distance when traveling at its maximum rate of speed. These brakes are operated by right and left foot pedals having sufficient leverage to enable their proper functioning on being applied by an ex-

tremely slight person.

The energy for driving the truck is contained in the battery equipment which is conveniently mounted under the hinged front



New Walker Electric Truck Combines Dependable Service with Economy.

hood and within the body, these locations being chosen with direct regards for accessibility and ease of upkeep. Three different makes of batteries may be used in this truck, which are: The Philadelphia 11 W. M. T., containing 42 cells; the Iron-clad 9 M. V., 42 cells, or the Edison A-5, 60 cells. For every charge of the batteries, it is stated, this electric will cover a distance of approximately 40 miles over hard, level and smooth pavements with half a load and at a speed of 15 miles an hour, if necessary.

The motor is series wound, having a large starting torque and high efficiency under variable loads. It is mounted upon ball bearings running in oil or lubricated by a pressure grease system. One motor comprises the power element which drives the truck through a propeller shaft having two universal joints. Large capacity cable is used for making the connections between the battery and the motor, which is well insulated and eliminates the possibility of energy being lost through any heating of the wiring. For regulating the speed, a series drum type controller is installed on the frame

under the floor boards which gives four speeds forward and two reverse.

If the chassis is ordered without the body only the priming coat of paint will be applied and the following accessories furnished: Two head lights, tail light, safety switch and key, hand horn, charging plug, front fenders, steps and tools.

The manufacturer states that the very best material obtainable has been used in building this product and he feels this fact, linked with the high standard of workmanship turned out at the Walker factories, will be instrumental in making this new addition a decided success.

PLAN BUSES FOR CONSOLIDATED SCHOOLS.

PONTIAC, MICH., June 10.—Michigan was swept by a school consolidation wave about a year ago, and many communities in the rural districts considered merging several school districts into one, with a central building and a bus line to bring in the pupils. Stating, that if such a change was made, it held very promising results to both industrial and business conditions generally.

Business depression at that time, which effected the farmers and the village both, resulted in the defeat of several of the bond issues proposed to put up the consolidated schools, with the result that the movement received a decided setback. A more favorable attitude toward bonding for such a purpose is now being manifested, which seems to indicate the actual success of the plan.

LEASES OFFICE FOR A FIVE YEAR PERIOD.

COLUMBUS, OHIO, June 14.—A lease of five years' duration has been taken on a large office space in the Rowlands Building at Third and Broad Streets by the Ohio Motor Bus Company with its affiliated companies: The Columbus Terminal and Motor Bus Company, the Motor Vehicle Transportation Service Company, and the John R. Stewart Company.

THE SPLITDORF MAGNETO

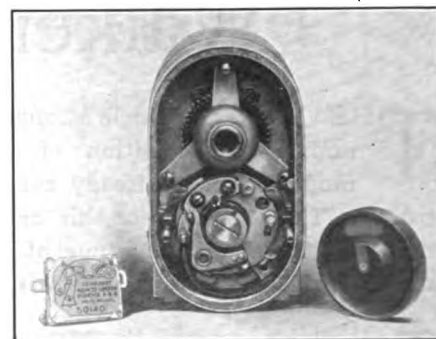
THE magnetos built by the Splitdorf Electrical Company show a tremendous advance in the inductor type of high tension magneto for which the company has been famous for a considerable time. The development of the new series has been under way for several years and is the direct result of attempting to improve the design of the company's inductor magneto so as to increase the efficiency. To obtain a greater electrical output has been the aim in the development of this new series. The new magneto is at present made in two sizes, the smaller one known as model S and the larger one known as model SS. The Splitdorf model S magneto is being manufactured in one, two, three, four and six-cylinder types. It is of a very neat design and light in weight.

THE model SS magneto is similar in construction to the smaller size and is particularly adaptable to larger engines or where a spark of greater volume is required. Model SS is especially adaptable to two spark ignition. It is manufactured for engines of from one to 20 cylinders, inclusive.

Ignition experts were tremendously interested in the figures taken from characteristic curves of these magnetos prepared by the engineering department of the Splitdorf Electrical Company to give an idea of the capabilities of the magnetos.

tating laminations are effectively fastened to the shaft by reason of being anchored in non-magnetic material which is cast under pressure around the shaft and laminations. There are several advantages in this construction, a solid shaft naturally makes a more rigid construction than one built up of several parts. The shaft is not magnetized and some magnetic leakage is therefore eliminated. The total magnetic reluctance of the air gaps has been reduced by increasing the areas.

The frame of the magneto is an aluminum die casting. In this casting are an-



Stationary Contact Points Make Possible Examination While in Operation.

done to insure good contact.

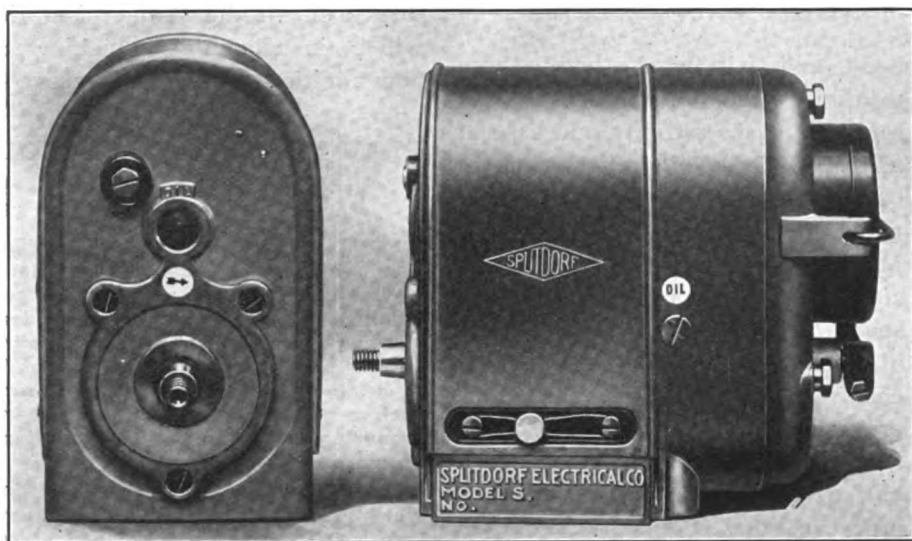
The breaker mechanism follows in general Splitdorf practice in which the breaker bar and stationary contact point are carried on a plate which is movable for advance and retard. The breaker bar is operated by means of a cam on the rotor shaft. By having the contact points fixed it is possible to examine them while the magneto is in operation. The bearing of the breaker bar shafts is not required to take current, a pig-tail connection, one end of which is fastened to the breaker bar and the other to the magneto frame, conducting the current from the movable contact point to ground on model S. The mica condenser, which is of standard Splitdorf pattern, is mounted on the breaker base and is carried in a metallic housing. On the face of the condenser is a card illustrating the method of adjusting the contact points. On model SS the condenser is attached to the frame of the magneto in the distributor compartment.

The advance lever is mounted in the front cover and by means of a short shaft and crank engages a slot in the breaker base, thereby allowing the base to be moved for advance and retard positions.

The distributor is mounted above and in the same compartment with the breaker. This compartment is closed by means of the front cover, which when removed provides an excellent means of examining the breaker and distributor mechanisms. The distributor disc is attached to the distributor shaft and in the model S magneto is provided with one segment, which contacts with the brushes in the distributor block. In the model SS the distributor disc has a brush which contacts with segments in the distributor block, or in the case of the model SS two-spark the distributor disc has two brushes, each brush having its own set of segments.

In the model S magneto a very simple method of fastening the spark plug cables is used. The block is moulded with depressions in both the block and cover. The spark plug cables are simply cut off to the proper length, pressed into these grooves and then onto a steel pin which pierces the insulation and contacts with the wire. The distributor block is fastened to the front cover and may be removed with it.

The insulating materials used in the Splitdorf series are Americanite and Bakelite, the first being an insulating compound of high dielectric and mechanical strength produced by the company.



The New Model S Splitdorf Magneto Combines Lightness with Neatness—Rotating Laminations Are Cast Under Pressure in Non-Magnetic Material.

The model S in advance position produces sparks regularly over a .020 inch spark gap under 60 pounds compression at 40 revolutions per minute and under 100 pounds compression at 90 revolutions per minute. Model SS under the same conditions sparks under 60 pounds compression at 30 revolutions per minute and under 100 pounds compression at 50 revolutions per minute.

In this new Splitdorf series the model S has a single permanent magnet, while in the model SS two magnets are used. The magnet or magnets are arranged with the planes transverse to the rotor axis. The effective cross-section of the magnets is the same from end to end.

The design of the rotor is particularly interesting. A through steel shaft supported on ball bearings is used. The ro-

chored two magnet pole pieces and two coil pole pieces. The casting is made of an alloy especially developed to take care of the differences in shrinkage and temperature. The surface on which rest the permanent magnets and the coil core are ground, as are also the ends of the magnets and of the coil core. This insures excellent joints at these points, which further increases the efficiency of the magneto.

The coil core is attached to the frame by means of clamps and the area of the joints at these points is considerably larger than in previous designs. More space has been allowed for the coil, which permits even greater insulation so that the possibility of electrical breakdown is at a minimum. Primary wires are soldered to the coil terminals, this being

3500 MILES IN BUNGALOW TRUCK

TRANSPORT Truck Company, Mount Pleasant, Mich., has just received an interesting account of a four-months' trip in a Transport "bungalow-truck". Mr. and Mrs. John Donahue of Spokane made the trip from Spokane snows to California beaches and home again in time for spring. Mr. Donahue is in the transfer business. He took a one ton Transport, used in his business, and equipped it with a bungalow body at \$200 expense. The truck home was equipped with beds, stove, clothes and food closets and electric lights.

THEIR PILGRIMAGE covered 3500 miles. The bungalow-truck was comfortable in a snow gale in the Siskiyou Mountains and on the sunniest day on the Pacific sands.

West of Walla Walla, where the mud was deep and the snows soft, the travelers overtook marooned motorists. It was sport for the powerful truck to pull the cars out and it was worth the effort to see the gratitude registered when the imprisoned drivers found themselves free to go,

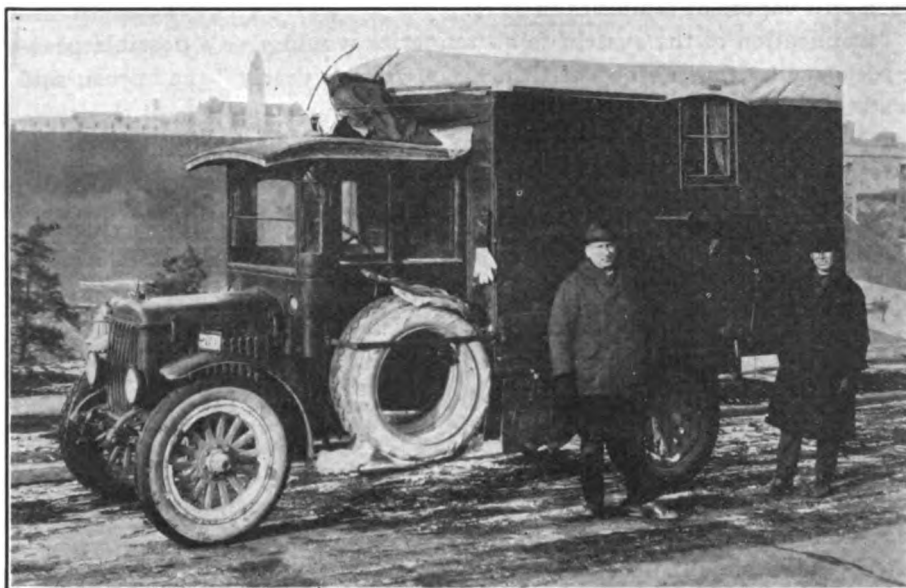
occasionally after long detentions. Mr. Donahue could have taken a fine toll in rescue work had he not joined the Help One Another Society of 10,000,000 automobile adventurers.

While still in the Walla Walla region a week ago, the Transport party came upon an automobile that had slid from the highway and turned turtle with its driver under-

neath. The traveler had freed himself. His car was replaced on the grade and supplied with gas and water from the Transport reserve.

The Donahues spent a week to three weeks in each of the coast cities from Seattle to Los Angeles and lived in the truck wherever they went.

Although run 10,114 miles, the truck has been given no repairs.



Transfer Man, Turning His Truck Into Bungalow, Takes Vacation Trip of More Than 3500 Miles and Enjoys Comforts of Home.

"CO-OP" GAS STATIONS PAY

ST. LOUIS, June 15.—How Mobile, Alabama, has solved the gasoline problem, is told of in a survey of the Mobile Cooperative Gasoline Company made by Lynn M. Shaw, assistant general manager of the National Automobile Dealers' Association, in a recent bulletin of the association.

The Mobile Cooperative Gasoline Company was organized to supply high grade gasoline at minimum prices to motor vehicle users. The primary purpose was in the interest of owners of fleets of commercial vehicles.

It was capitalized at \$10,000. The stock was in shares of \$50.00 each. Most of it was sold to the fleet owners. The balance of it was offered to and bought by members of the automobile club.

Two filling stations (curb pump types) were first established. Gasoline was purchased in quantity. All stockholders were expected to buy from the Co-Op stations. The stations also were to sell to any other persons who desired to buy. The quantity purchase of gasoline made possible the retailing of gasoline at a price a few cents less than that at which gasoline was offered by the larger companies.

Two more stations were added. The four stations are now operated by girls. The gasoline is purchased in enormous quantities. The Co-Op owns and uses four large storage tanks.

It is buying gasoline at 17 cents and selling it for 21 cents a gallon. This price is two, three and five cents lower than gasoline can be bought in cities within 100 miles of Mobile. The price of gasoline at the filling stations conducted by the large oil companies is the same as that at the Co-Op stations and therefore several cents less than the prices at which these same companies are selling gasoline elsewhere in Alabama and other states.

The girls who operate the Co-Op stations are "hard-boiled," so that mashers and kidders get nowhere. These girls act as though they own the stations. They must pay out of their pockets for the amount of gasoline unaccounted for, in cash or in the tank. They give a courteous and snappy attention and service that is noticeably different from the ordinary type of gasoline station service.

Many women are driving motor cars. Women are natural economists. They seem, in Mobile, to keenly appreciate

that the Co-Op stations are the reason for low price in gasoline. And they seem also to like the attendance of girls at the stations. This increases the sales, maintains volume.

Volume is of keen interest to the Co-Op. The greater the volume the greater the profits, as in any other business. And each 60 days the Co-Op declares a dividend to its stockholders. It has not failed to declare a dividend in the several years of its existence. This dividend sometimes amounts to two or three cents per gallon. It is figured out on a different basis than that, but the stockholders like to talk about a per gallon dividend. Because to the stockholders this is an additional cut in the price of the gasoline they use.

The capital stock of the Co-Op has never been increased. But its value is considerably higher. If it were possible to buy stock in the Co-Op today—and there is none for sale—it would change hands at \$300 per share. That was the last quotation on it, when it was withdrawn from the market in 1919. The original capital is still intact and there is a large surplus and a reserve that is piling up all the time.

Conservation of Gasoline

Petroleum Companies Operating Process of Condensing Vapors from Refinery Stills May Save Millions of Gallons of Fuel Annually, Says Bureau of Mines Executive.

POSSIBILITY of increasing the output of gasoline by 120,000,000 gallons through more complete condensation of still vapors at the petroleum refineries has been suggested by the Bureau of Mines after an investigation by D. B. Dow, the bureau's petroleum engineer.

Mr. Dow estimated that 50,000,000 gallons were recovered from uncondensed still vapors at refineries in 1921.

"Application of the system to all refineries would give a possible gasoline recovery by this method of 170,000,000 gallons yearly," the bureau said in a statement.

THE calculations of the Bureau of Mines are based on results obtained in refineries whose general methods in the hundreds of smaller skimming plants have no recovery systems. It is assumed that in the less efficient skimming plants, located in sections where the supply of cold water, so essential for condenser use, is scarce, greater recoveries could be made than in the large refineries studied. This should be especially true of Oklahoma, North Texas and Louisiana skimming plants, where summer temperatures are high and where cold water is scarce. A survey of these plants, it is believed, would show that their losses in uncondensed still vapors would be much higher than in the plants where the studies of the Bureau of Mines were conducted.

"The magnitude of the loss from non-condensation of these vapors has been realized only by few refiners, judging from the number of plants that have recovery systems. The 13 refineries studied by the Bureau of Mines are obtaining 128,651 gallons of gasoline daily from uncondensed still vapors. These plants are situated in the various refining centers, other than the Pacific coast, and are running crude representative of all the producing fields east of the Rocky Mountains. In addition, several are running Mexican crude. Information from California refineries indicates that on account

ure to condense still vapors will increase in the future, because crudes are being handled in the field with more and more care to avoid evaporation and will, therefore, contain much lighter and more volatile fractions than at present.

"Condensation of the vapors formed by heating crude oil is effected in the refinery by leading vapors through coils of pipe submerged in water. On cooling, most of the vapor becomes liquified; but a certain amount of vapor, due to insufficient time for proper cooling, or the fact that its condensing point is lower than the temperature of the water, will remain uncondensed. Also, certain other fractions will not be condensed, for the reason that their liquifaction points are affected by the presence of other hydrocarbons.

A small part of this uncondensed vapor is dissolved in the liquid that has condensed.

Condensation of the vapors coming from the still into liquid is accomplished either by passing them through pipes or shells having large surfaces exposed to the air or through coils submerged in water.

Atmosphere temperature is an important factor in the production of gasoline from uncondensed refinery vapors.

It is found that during winter months, due to more complete condensation of the vapors, the production of the "gas" plant will fall off to some extent. An unusual example of this is a certain skimming plant which produces about 6000 gallons of compression gasoline daily through the summer months, but drops to as low as 500 gallons per day in the winter. Ordinarily the difference is far less, but there is always a tendency for production to drop in cooler weather.

Play Safe

1. Put yourself behind the other man's steering wheel.
2. Don't laugh at timid passengers. They're your guests. Make them comfortable.
3. Don't expect children to look out for themselves. The fact that it was the child's "fault" doesn't make death less terrible.
4. When a man in the wrong insists on the right-of-way, let him have it. You can't argue with a fool.
5. Get the hand-signal habit. It protects you as well as others.
6. When the man behind wants to pass, slow down and draw over. It's safer to have him speeding ahead of you than alongside you.
7. Don't dash by street cars as they are about to stop.
8. Don't try to pass the car ahead when another car is approaching from the opposite direction.
9. Slow down and keep to the right as you come to the crest of a hill.
10. Don't dispute the crossing with a railroad train. What's the hurry?
11. Think of the other road users when you have to splash through mud or water.
12. Remember that the pedestrian at the crossing has a right to cross.
13. Don't drive jerkily. It keeps the man behind you worried.
14. When your brakes aren't working the time to get them fixed is NOW.
15. If you forget the Rules of the Road you can safely fall back on the Golden Rule.

of the smaller gasoline content of the California crude there are no recovery plants of importance in that state. The average recovery of gasoline at the refineries investigated by the Bureau of Mines amounted to four-tenths gallons per barrel of crude oil charged.

"Unless preventive measures are adopted, losses of gasoline from fail-

High Schools to Study Transportation

PROMPTED by the success of the educational outline on highway transport prepared for university use under their direction by Prof. Lewis McIntyre, the officials of the Highway and Highway Transport Education Committee have now turned to Prof. Buckner of the School of Education of the University of Pittsburgh to translate the book into language designed for use by high school students throughout the

many thousand high schools of the country.

The new pamphlet will be prepared in cooperation with officials of the United States Bureau of Public Roads, the United States Bureau of Education and other organizations represented on the committee and will be the first comprehensive effort to place the subject of highway transport before the high school students of the country.

THE first edition of the McIntyre pamphlet of 3000 copies was exhausted almost as the book left the press and more than 2900 requests for additional copies have been received from educational authorities all over the United States. Prof. A. H. Blanchard, University of Michigan, has asked for an additional 1000 copies for use in classroom work and for distribution among students of this problem, while many college students now preparing graduate theses on transportation have asked for the book.

Copies have been sent to practically all foreign countries and the response everywhere has indicated the need for condensed information of this character.

Bureau of Education Preparing Grade Outlines.

Officials of the educational committee plan a thorough revision of the text in the fall, at which time much new information which is constantly being made available from the studies of the Bureau of Public Roads and other agencies will be added.

Mrs. Florence Fox, specialist of educational systems in the Bureau of Education has been working for several months in the preparation of an outline on highway transport for use by students in the fifth and sixth grades. This work has taken the form of project teaching, by means of which the pupil examines the relation of highway location, construction and use to the historical, civic, geographical and economic development of the community in which he lives, as well as learning something of their national significance.

The course is now being demon-

strated in the Thompson grammar school in Washington, D. C. So interested have the pupils been that they have spent much time out of school hours in having their parents drive them to the various bridges and highways of Washington in order to learn something about them at first hand.

Essay Contests Well Received.

Both the safety and Firestone scholarship contests conducted by the committee have created widespread interest. The safety contest which offered prizes to teachers preparing the best outline for a course in safety instruction and for the best essay submitted by a grammar school student, has now closed and prizes will be awarded shortly in many states as well as in the nation.

Mrs. Warren G. Harding, wife of the President, has consented to act as honorary chairman of the essay contest and both this committee and the one of essays are made up of men and women of national reputation.

As indicative of the general interest it may be noted that those government and private organizations concerned with a sound development of highway transport have been hard pressed in the past few months by the requests for basic information received from students all over the United States, Porto Rico, Hawaii, Alaska and the Philippines. Thousands of pamphlets have been sent out and the character of the essays and lessons submitted shows an exceptional grade of effort.

Annual Renewal of Firestone Scholarship.

Announcement of the annual renewal of the Firestone university scholarship carrying with it a \$4000

scholarship to the high school student writing the best essay on "How Goods Roads Are Helping My Community," has again set thousands of students to work on this theme.

The contest has been given much space in the daily press, while many magazines, such as Collier's, have commented upon it editorially. The Literary Digest sent out 300,000 notifications of the contest to high school teachers all over the United States.

Maryland Conference Report in Press.

Proceedings of the conference held at the University of Maryland several months ago when economists, highway, educational and industrial authorities on highway transport reviewed the problems ahead in highway transport, are now in press and will be ready for distribution shortly.

Other publications which have been distributed include the proceedings at the Universities of Pittsburgh, Michigan and Yale, where similar conferences, but with varying themes, were held.

In addition articles have been prepared for and printed in daily newspapers, magazines and scientific journals. An entire chapter of the Highways Green Book, issued by the American Automobile Association, reviews the educational results of the committee's work.

Highway Transport Exhibits Ready.

Ten sets of a rubber exhibit designed to show the various elements entering into the composition of a rubber tire from raw material to the finished article have been prepared for distribution to the colleges.

(Continued on Page 341.)

Care of the Truck Tire

OVERLOADING and under-inflation have an almost identical effect on pneumatic tires. The motorist who reduces his tire pressure to gain extravagant riding comfort or who puts on too heavy a load should not overlook the fact that doing these things leads to early troubles that too often are credited to some defect in the construction of the tire.

The skilled engineer can tell at a glance when the tire finally breaks down in this way just what has caused the trouble. When he opens the carcass of the tire he finds that the plies of fabric have pulled apart, and knows that the tire has been run while overloaded or under-inflated. Let us see what happens when trouble of this kind occurs.

A TIRE is constructed with the idea that it is to be inflated to such an extent that it will retain its curved outline as the wheel revolves. If there is not enough air in the tire, or if it is overloaded, the part of the tire that rests on the ground will unduly flatten out instead of remaining rounded. This flattening is called "distortion" by tire engineers.

A simple experiment will illustrate clearly just what takes place within the tire when it is being deflected or distorted and why too great distortion is so destructive to tire life and why such emphasis is placed upon the importance of keeping this distortion down to the lowest point consistent with good riding comfort.

Take a book with flexible covers and make a mark straight across the ends of the pages at the top. The mark should be made about two-thirds of the distance from the binding to the other side. Bend the book sharply across the middle. You will note that as the book bends the line begins to lengthen and to assume a diagonal position. This means that the pages have moved, some of them a considerable distance.

A tire is built up of layers, resting one upon the other, just as the pages lie one upon the other in the experiment just outlined.

But there is this essential dif-

ference, that the pages are not fastened together and slip over each other easily when they are bent, whereas, between the plies of a tire are layers of rubber gum which bind the plies together. When the plies are bent out of position, they cannot slip over each other as the pages do, and, if the tire is not to be injured, there must be no greater distortion of the plies than is afforded by the stretch in the layers of rubber. If there is too much distortion the layers of rubber will be stretched too far and will gradually be torn away from the plies of fabric.

It is pretty well understood that a tire as cured is approximately the shape it is to assume when finally inflated. This is a highly important feature of tire construction, for only by curing the tire in this shape can the minimum amount of strains be limited within the tire structure itself.

When the tire is inflated and supporting a load it will be noted that there is a decided flattening of the true circular shape the tire originally had and a short bending of the plies, and, owing to the tire being constructed of several plies of fabric, there must be some differentiating medium to balance the difference between the movement of the inner, intermediate and other plies of fabric. Also some bonding medium to tenaciously hold the plies together enabling each to move somewhat independently of the

others and still allow the complete tire section to act as a unit.

The best bonding medium for this use has been found to be compound rubber, consequently, each ply of fabric is impregnated and coated with a thin layer of this highly developed substance. In addition to acting as a bonding medium, this layer of rubber also functions as a protecting coating preventing the alternate plies of fabric from coming in contact with one another, thus preventing the chaffing action between the plies that would, eventually, destroy the fabric if some means were not used to keep them separated.

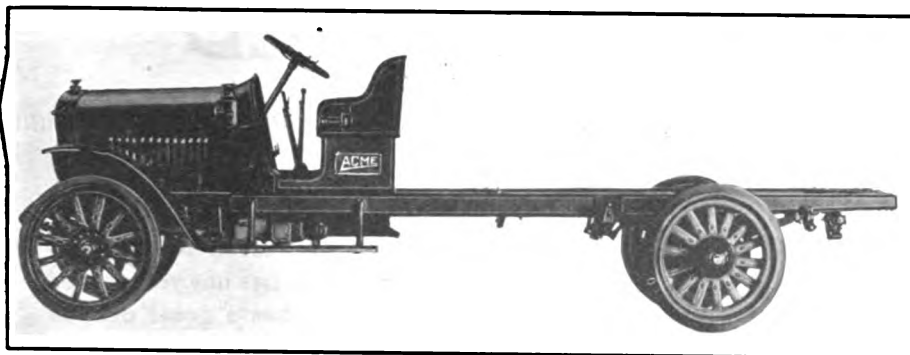
When a tire is supporting a load there is flattening at the point coming in direct contact with the road. This action is quite clearly seen at "B", where the two plies of fabric have been flattened out. There is a noticeable difference in their length; this difference is compensated for by the stretching of the thin layer of rubber separating them. This is exactly what happens between each ply of fabric in the tire when it is subjected to a load, and, if this load is not in proportion to the inflation pressure, the layer of rubber soon breaks away from its fastening, allowing a frictional movement that soon weakens the casing to such an extent it can no longer withstand the inflation pressure and the inevitable happens with a report that leaves no doubt in the rider's mind as to what has happened.

New Home of the Bassick Manufacturing Company



Demand for the Bassick Lubricating Systems Has Now Become so Great That Even This New Modern Plant Is Operating to Capacity to Keep Up with the Orders That Flow in with Every Mail.

ACME SHOWS A NEW ONE



The Needs of Fire Departments, Passenger Busses, Moving Vans, Long Distance Hauling and Road Building Are Adequately Filled by This New Model.

THIS model was designed and built to meet the combined requirements of power and speed for various installations such as city fire departments, passenger busses, moving vans, long-distance hauling, oil field requirements and road building. It is equipped with a Continental Red Seal motor with a removable head. This motor is of larger size than used in the Model 60, representing the latest development in truck motor design.

GENERAL SPECIFICATIONS.

Capacity and Weight—Maximum pay load, 6000 pounds; body allowance, 1600 pounds; weight chassis, 5050 pounds; weight cab, 160 pounds; total weight of loaded truck, 12,810 pounds. Any increase in body weight above allowance made reduces correspondingly the pay load.

Weight Distribution—

	Front	Rear
Chassis only.....	53%	47%
Maximum load and body.....	20%	80%
Total, including chassis, cab, body and load.....	34%	66%

Wheelbase—156 in. (standard).

Chassis Length—235½ in. over all.

Loading Space—140½ in.

Tread—Front and rear, 55½ in.

Turning Radius—32 ft. approximately.

Road Clearance—10 in. under rear axle.

Over All Width—75½ in. over rear hubs.

Speeds—(Governed) Miles per hour, at 1600 revolutions per minute, first, 5.4; second, 7.6; third, 15; fourth, (direct), 28. Reverse, 6.

Motor—Continental Red Seal, Model L-4. L head, four cylinders cast in pairs. Cylinder head removable. Cylinder sizes, 4½ in. bore by 5½ in. stroke; displacement, 350 cubic inches.

Oiling System—Gear type oil pump; forced feed to crank shaft bearings, connecting rod bearings, piston pins and timing gears. Cylinder walls, cam shaft bearings and valve mechanism are lubricated by oil throw-off from the connecting rods.

Cooling System—Centrifugal pump.

Carburetor—Rayfield, type G3P, 1¼ inch intake.

Magneto—Eisemann, variable spark, waterproof type. G4 model.

Rear Axle—Timken-Detroit worm drive. Full floating type. Gear ratio 6 to 1.

Front Axle—Timken solid drop forged. I-beam section. Size, 2½ in.

Transmission—Cotta, selective type, constant mesh. Mounted unit with motor.

Frame—Pressed steel, semi-flexible. Width back of seat, 34 inches. Side rail dimensions, six in depth, 3½ inch flange, tapering to 2 inches. Thickness of metal, ¼ inch.

Clutch—Borg & Beck, single dry plate. Size, 12 inch diameter; 2¼ inch face.

Springs—Detroit, bronze bushed. Size, front, 2½ inches. Width, 40 inches length, 9 leaves. Rear, 3 inches width, 52 inches length, 12 leaves.

Steering Gear—Ross irreversible nut and screw type, "fore and aft" style. Size wheel, 20 inches. Throttle and spark control on steering wheel. Foot accelerator.

Drive Shaft—Two-piece, solid shaft, 1½ inches diameter, three extremely heavy universal joints. Shaft supported in center by self-aligning bearing.

Brakes—Timken, duplex double knuckle, internal expanding type. Drum diameter, 18 inches; drum width, 5½ inches. Total braking area, 396 square inches.

Radiator—Cast tank type, tubular cores. Spring support at bottom of tank. Centrifugal water pump circulation.

Wheels—Wood; 36x4 front, 36x7 rear, solid tires. Spokes, 14 front, 2 inches square; 14 rear, 2½ inches square.

Tires—Solid rubber; 36x4 front, 36x7 rear. Pneumatic equipment at extra cost, 36x6 front, 40x8 or 42x9 rear.

Gasoline Tank—Seamless welded steel. Capacity 29 gallons. Located under driver's seat.

Vacuum System—Stewart. Insures uniform gas feed and pressure.

Lubrication—Alemite greasing system.

Hubodometer—Veeder, recording 100,000 miles.

Equipment—Seat, lamps, horn, jack, tools and tool box.

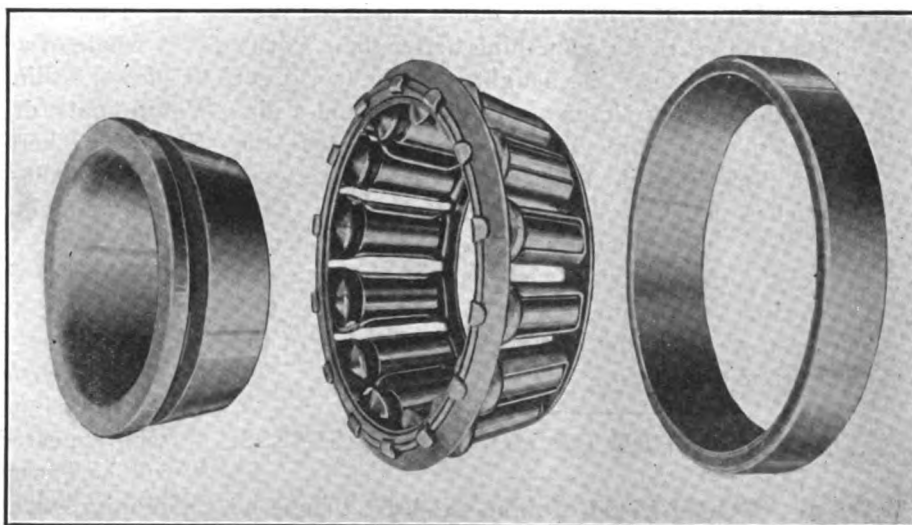
Paint—Standard full paint color, Acme blue.

BOCK TAPER ROLLER BEARING

THE Bock Taper Roller Bearing is made by the Bock Bearing Company at Toledo, O., a company that commands an enviable position in the field of bearing manufacturers.

THE underlying principles of taper roller bearing construction are the groundwork for the Bock design, and to a certain point are identical with those employed in the design of other types.

There is an inner race, or cone, an outer race or cup, and the usual interposed taper rollers. The contact surfaces of these several components are inclined to the axis of the bearing in such a manner that the extension of these surfaces will converge to a common point on the axis of the bearing. The action, therefore, of these surfaces, on each other will be that of pure rolling, since at any given point the surface speeds of the parts in contact are the same.



Taper Roller Bearings Which Are Theoretically and Practically Correct Is the Claim Made by the Bock Bearing Company for Its Product.

It will be apparent that should these surfaces be extended in either direction the action at any point of such extension

would be identical to that described above. This fact is the basis of the design of Bock taper roller bearings.

PERTINENT POINTED

THE JINGLE OF TRACE CHAINS.

YES there are a few of them left—the teamsters who consistently refuse to exchange their tired old horses and heavy lumbering drays for the up-to-date motorized equipment. We see them—only once in a while to be sure, urging on their decrepit old dobbins with voice and whip, trace chains jingling, iron-tired wheels clattering over the cobbles; the driver sitting hunched up on his springless seat with a look that seems to indicate a general feeling that the world is a tough place to live in. And well it might be if living in it is exemplified by the dray man's daily life. Up in the morning at an unearthly hour, feeding and cleaning the horse, clearing out the stable—and then starting out for the day's work with an ill-tempered nag and a creaking truck wagon.

To the credit of modern progress be it said there are only a few of these "old-hoss-and-dray-men" left—and it is just as well if some of them never get to the point where they become possessed of a motor truck, because the man who hasn't already had the vision and done away with his horses in favor of the commercial vehicle, will never by any chance be anything but a very small operator.

Owning a truck to a man of this type would in a sense rank as a misfortune—he would probably make so much money he wouldn't know just what to do with it; his family might get high ideas and yearn for something better than "corn'-beef-an'-cabbage," the daughter might try to get into the moving pictures, the wife demand a flivver, and—his home life roughly disrupted—the man himself might take to smoking cigarettes—which would indeed be a misfortune.

Yes, there must always be a lower order in every form of existence—it's nature's way of creating and maintaining a balance, and for this reason we shall always have with us a few of the old time dray men.

THE TRAGEDY OF MODERN BUSINESS.

A GOOD friend of mine—at least I hope he is, although I never saw him—in writing to tell me of conditions in the South says: "This territory like a great many other territories

is suffering for the particular reason that the garage man and accessory dealer has not yet learned to collect cash for his sales, has a great deal of past due accounts on his books and therefore cannot take care of his jobbing accounts."

With my inquiring and perhaps slightly cynical mind I find the tragedy of modern business in his terse statement. The fault lies in great measure with the dealer who, to a great extent operating on credit himself, cannot seem to understand that every piece of merchandise which leaves his shelves unpaid for is exactly as so much cash would be if taken from his pocket. He must collect for what he sells or else a plain spoken sheriff with baggy trousers and a half chewed cigar will come calling around carrying a carefully worded paper and a handy tack hammer—but for some reason he is blind to this fact many times—until it is too late. And when the time comes—when he is declared a bankrupt—there is another who shares his misfortune—and that is the jobber who trusted him with the goods.

Modern credit methods are altogether too slimy—too slipshod, if I may use the word, and the sooner the trade associations realize the very potent methods for rectifying this evil that have been placed at their disposal by friend Hoover the better it will be for all concerned.

I knew an old merchant down home who did a whale of a big business in drygoods, groceries, plows, sealing wax, half soles, sewing machines, hip boots, dried beef, umbrellas, cabbages, sweet pickles, kerosene oil, plug tobacco and fancy lamp shades. Everybody said he was getting rich and talked of the money they thought he had salted away. But he died without a tenth of what the lowest estimator had credited him with. I also know another business man down home—the village blacksmith (we had two of these "brawny-armed" worthies in our town) who never had more than one helper at a time and who appeared to do a very moderate business—yet he "passed on" and left what in that community was regarded as a fair sized fortune. Folks marveled at the manner in which he had accumulated the money, but my grandfather, who was executor for both of the men referred

COMMENT OF THE DAY

to, told me that the storekeeper had more than \$20,000 on his books—some of it dating back 30 years, while the blacksmith's accounts showed almost no money owed to him.

"Doing a whale of a business" sounds "big-goty," but it doesn't mean anything if you aren't getting what is due you.

A WORD ABOUT IMITATORS.

HOW does the old maxim go—"Imitation is the sincerest form of flattery" or something like that? My reason for calling it to mind is that it gives me something with which to start this short article about "Imitators."

My excuse for the article dates back to a flying visit through the middle west, which, begun as a vacation of a sort, resolved itself into a tough business trip. There were bright spots in the journey, however; among them the privilege of spending a day with the inventor and manufacturer of a most efficient truck accessory. (Right here I want to state that the word "efficiency" is overworked by a lot of us—but it's peculiarly descriptive of the item regarding which I speak, so we won't bother to look in the Roget for a better one).

This accessory in its method of functioning, its carefully planned design and its manufacture is about as high class as anything of its kind that I have ever been privileged to see. It represents the life work of its inventor and to my way of thinking is something of which any man may well be proud. And just to show the caliber of the manufacturer he isn't wholly satisfied with it yet, but intent on making it ever better, is constantly experimenting with advanced designs, even though in its present form it entirely suits the factory engineers connected with several builders of cars and trucks on which the device is standard equipment.

In my examination of the device, or rather the parts which make up the finished product, I noted that everything that went into the making of the device was about as carefully finished as it was possible for it to be. I mentioned this fact and commented on the machining of what to me appeared to be a rather unimportant part of the article.

"Would it be necessary, for the correct operation of the device, to have this part machined?" I asked. "It doesn't show."

The manufacturer laughed and said that while it wasn't absolutely necessary to machine it, he preferred to finish it off in that way as it gave added efficiency (there's that word again) to the unit.

"But there are some unscrupulous manufacturers who have copied the device and are selling it on the open market," he said, "and they haven't taken the trouble to machine any part of it. The whole thing as they make it is finished off with a cheap enamel and functions in a hap-hazard way," he said. "Still it takes a good photograph, looks well in an advertisement and perhaps the average person is well enough satisfied with it—if he doesn't know there's a better one," he finished somewhat bitterly, I thought.

"But how can they make an imitation of your product and get away with it," I asked, remembering the many patents covering the accessory that had been shown to me. "You've got it sewed up tight I should think."

He laughed. "Perhaps you don't know the ins and outs of the manufacturing business," he said. "The article I speak of doesn't wholly imitate mine; there aren't any patents on it either and the man who is building it never spent 10 minutes in thinking about it—he merely copied my design to a certain extent and started in selling the article. I can't do anything about it probably—at least I'm not going to spend my good money in trying to," he said. "It wouldn't be any use. He'd simply peddle them until I made it so hot for him that he'd have to stop; he'd still do business though because he'd switch over into manufacturing something that another fellow had spent his time and effort in perfecting. As a matter of fact I don't know as I could actually convince a jury that he is legally infringing on my patents—but he certainly is from the moral standpoint. His stuff is simply an imitation."

* * * * *

Imitation may be the sincerest form of flattery for all I know; perhaps it is, but it's hard on the man whose goods are imitated.

(Continued from Page 291.)

Suddenly he spoke—in a chastened manner.

"What you say is right," he admitted. "I was thinking of it just when you came by. The trouble is I can't get another start. It's too late in this town. But I'd like to try it all over. Somewhere else, perhaps."

"You can," I said, but not somewhere else. Right here is good enough. You don't owe anything on the shop?

"No," he answered. "The wife has kept me finding the payments. Now I own it outright—have since a year or two ago."

I nodded. "You're lucky—to have the wife, I mean." There wasn't much I didn't know about this man—we had been boys together, and had grown up in houses that adjoined each other.

"Here's what you've got to do, Carl," I said seriously. "Just this: Start in and clean out this place, first of all. It's cement throughout and it'll look just as good when it is clean as it ever did. It's only three or four years old at the most."

"Clean it all out, all the rubbish—everything but the vise and the bench. The two or three tools that are good you can keep too. The rest—give it the ras'—throw it into the dump. If you'll do just that and trust me I'll guarantee to have you on your feet again inside of a month. Are you game to go ahead with it and not ask me any questions?"

He said he was and when two days later I went back to the shop in response to a telephone call—it was transformed. I had never realized what a nice shop it was: now that it had been carefully put in order—windows cleaned and floors scrubbed—it was another place. As I entered he was repainting his sign and doing a good job, too, in his usual handy manner.

"Pretty good looking repair shop," I said, as I glanced around.

"Better'n I thought," he answered, and I could see that he was jubilant. "What's the next thing on the docket?"

"Get some tools," I answered.

"How much money have you got?" He told me that he could get as much money as he needed from an uncle who had put up the shop in the first place.

"The old fellow surprised me yesterday afternoon," said Carl. "He came around and gave the place the once over when I was scrubbing up. I thought he was about through with me—though I don't owe him anything, but he said, when I explained what I was doing, that I could count on him for what shop equipment I would need."

"That's fine," I said. (I didn't think it necessary to tell him that I had seen the uncle and talked with him). It was a pretty tough argument, but I won the old fellow over—which is one reason why the young man now operates one of the most up-to-date shops in the state.

I won't bore you any further with the details of this story. You get the idea. It was only about seven weeks ago when I started in on Carl, but today he's got all the trade he can swing to and a lot of his customers are old ones. He and I have sent out more than 1000 personal letters to different customers around the town—we do the work evenings—and believe me that's a busy repair shop today and getting busier. As for Carl—I don't believe he's

been in bed later than 5:30 any morning since he "got a fresh hold" as he expressed it. And the three-legged chair that use to stand in the sun at the front of the shop—the chair where he used to spend most of his time on warm days—has gone to the dump—along with the baby carriage wheel, the greasy waste and the piece of inner tube that looked like a fountain syringe.

A Seller or a Buyer?

THE LAST place at which I stopped during my travels on that day in late spring—and the May morning had turned to a May afternoon by that time—was at the salesroom of a man who sells a well-known line of light trucks. I consider this make of truck among the very best that the industry has and have called on this dealer quite a few times during the several years I have known him. I'm young enough to learn, I believe, and this dealer always gives me something to think about whenever I meet him.

I feel quite at home in his establishment, although it is a big one—plenty of plate glass, customers' room, negro porter and all that. This dealer is a business man at all times, but, in some way or other, possesses that rare accomplishment of combining dignity with good fel-

(Continued on Following Page.)

EXPRESS BODY WITH TOP



This Providence Body Company Job Is Eight Feet Six Inches Overall and 45 Inches Wide at Inside Rear of Seat. Floor Boards Extend Out Four Inches on Either Side. Windshield Folds and Has Rubber Strips on Edges, the Whole Being Set in Wooden Frame. Two Cushions Are Used in Seat with Lazy Back for Driver's Comfort. Curtains Are of Number 10 Ounce Oil Duck. Metal Work Is Hand Forged Throughout. The Price for This Very Good Job Is \$220, Which Appears to Be Very Reasonable for the Quality of Materials and the Workmanship Entering Into the Construction.

ELECTRIC BELL CALLS CUSTOMERS

Housewives of Columbus, Ohio, need no longer listen for the huckster's call. In the words of the comic strip, "Them days is gone forever." C. H. White, a Columbus fruit and vegetable merchant, has modernized the method of vending these commodities.

Mr. White recently purchased a Ruggles one-ton truck for delivering fruit and vegetables to his cus-

with the vari-colored fruits and vegetables.

The Ruggles Truck has become a traveling store for Mr. White. It saves the housewives making trips to the grocery store or the market. They are willing to pay the higher price for provisions delivered in this manner as it saves them making special trips, and they also know the fruits and vegetables are fresh.



A Ruggles Truck Chassis Is Used in the Construction of This Up-to-Date Sanitary Travelling Market. An Electric Bell Calls the Busy Housewife.

tomers. He had the truck fitted with an electric bell as special equipment and now, as he drives along, instead of shouting to attract his customers' attention, he merely pushes a button that starts the bell ringing.

Mr. White has laid out a schedule with train-like accuracy so that housewives know just about what time to expect him. They can hear the electric bell farther than they could hear the voice, so are ready when he arrives. Delay is thus eliminated and more territory covered in a day.

The special body used on this truck is unusually beautiful and remarkably efficient. It is five feet high with glass windows on all sides, giving the effect of a show window, from which housewives can inspect the fruits and vegetables. The latter are arranged on trays in two decks, making them easy of access. The truck body is painted marble white, forming a pleasing contrast

(Continued from Preceding Page.)

lowship and is a mighty easy man to talk with. As I entered and took a seat near his desk, he was holding a telephone connection, or, to be exact, he was listening to the person on the other end of the wire. In a moment he spoke. I hadn't heard the start of the conversation, but knew from what followed that he was talking to a prospective purchaser.

"Sorry we can't do business, Mr. Wilhelm," he said gently. "Fact is I'm not making more than a reasonable profit in allowing you the amount I mentioned, and for that reason, even though there's only \$50 difference between our figures I guess it'll have to be called 'no-sale'—and, after saying good bye, he hung up the telephone and turned to me with a good-natured 'hello.'"

"You don't appear to take that lost sale very much to heart," I said, accepting one of the anaemic looking cigars from the box which

he passed.

"What sale?" he wanted to know.

"The one you were talking about when I came in" I said.

He laughed. "That wasn't a sale was it?" he asked. "Sounded to me more like a 'swap'."

"What's the difference? Isn't more than half the retail truck business done by swapping?"

"Not in this establishment", he laughed, leaning back in his office chair. "I suppose you'll be surprised to hear that only thirty per cent. of my business is done on the trade basis. It's a fact though," he continued, when I had expressed my surprise. "I may lose a few sales—if you can call it losing sales—by my policy—but I'm not going to change it. If a truck is in good condition—I mean by that, if in good enough shape to resell with a guarantee after a coat of paint and an hour or two of mechanical attention—I'll do business on a trade proposition, but if it is going to cause me any particular outlay—some other dealer'll do the business. The old truck, regardless of what you say in its favor, is an old truck—that's all there is about it. If its owner has used it to the point where he can't use it any further without laying out a lot of money on it—then let him get rid of it in the best way he can—if it isn't any good to him, it isn't any good to me—if he can't sell it for a fair price then I can't sell it for a fair price. It's worth just as much to me as it is to him—and not a cent more. That's logic, isn't it?" "I get the idea," I said. "How does it work out for the customer?" "I'm not too concerned whether it works out for the customer or not, to tell the truth," answered the dealer—although my remark may be far from diplomatic. "What I do know is this—I'm not in business of peddling second hand trucks—not yet. And furthermore I'm not in the business of buying second hand trucks. If there's any selling to be done, I'll do it selling new trucks—I'll be a salesman—not a customer."

LEGAL POINTS

By SAMUEL WANT

MOST policies providing for accidents due to "collision" contain a specific provision that they shall not cover damages caused "by striking any part of the roadbed." It has been decided that the curbing of a street is a part of the roadbed within such an exception, and hence that damage caused by colliding therewith is not covered by the policy. On the other hand, the guttering along a highway is not within the exception in question.

IN A recent case an automobile standing in a garage was damaged by the second floor of the garage falling on it. It was decided that this accident did not come within a policy protecting the owner against damages arising from "collision."

A RECENT decision of the Court of Appeals of the District of Columbia points a warning about the protection of insurance where a lien is given on a car. Most policies provide that the insurer must be notified if a lien is placed upon the car, and that the policy shall be absolutely void if this notice is not given. In the case in question this provision of a policy was enforced, so that the owner of a car sustained a total loss on a claim that otherwise came squarely within the terms of his policy.

IN A recent Ohio case the evidence showed that a wholesale house kept an automobile for the use of its salesmen. The car was used on the occasion in question by the bookkeeper and cashier, and through their negligence a pedestrian was injured. There was no evidence to show that the parties referred to had any right to use the car, or that they were using it in the prosecution of their employer's business at the time of the accident. The court held that the owner of the car was not responsible for the accident.

THE new edition of Huddy on Automobiles, recently published, collates the latest decisions construing automobile insurance policies covering "collision." It is found that these policies are held to cover collisions with either a moving or a stationary body. In fact, the expression, "collision with," as used in a policy, may be deemed equivalent to "striking against." And the stationary body with which the car finally comes in contact may be either land or water. Thus a loss resulting where a car was precipitated over a bridge into the water below, and was damaged solely by the immersion, was decided to be covered by a policy covering "collision." But in a case where the injury was caused by turning in a ditch at the side of the road

when passing another vehicle, causing one of the wheels to collapse, it was decided that the loss was not covered by the policy.

QUIETLY and unremittingly the courts are doing effective work toward the suppression of the growing evil of automobile stealing. Recognizing that the underlying factor in the situation is the facility with which stolen cars may be marketed, the courts are laying down the law relative to the receipt of stolen property with a severity and particularity that leaves little room for escape upon the part of even the most astute receivers.

In a recent prosecution in Kansas against the purchaser of a stolen car, upon the ground that he purchased it with knowledge or suspicion of its felonious acquisition by the seller, the principal evidence relied upon by the prosecution was the simple fact that the engine number on the car appeared to have been altered. The defendant contended that he did not attach any importance to this when he bought the car, and that he had no knowledge that would indicate fraud or crime on the part of the seller. The court held, however, that the mere fact of the alteration of the engine number was sufficient to put a reasonably prudent man upon inquiry, and to arouse his suspicions and, that where such a condition is proved and is not explained away, a jury may infer that the purchaser of the car had knowledge pointing to its theft by the seller. This ruling was sustained, on appeal, by the Supreme Court of Kansas.

ACCORDING to a recent decision of the supreme court of Kentucky, the father is liable for injuries inflicted through the negligence of his son in driving the car of the former, where the former permits his son to use the car. In the case in question, the son was out for a joy ride with his friends when the accident occurred, and the father sought to escape liability because the car was not being used in his business or for his benefit at the time.

ANOTHER important decision on the same subject has been rendered by the supreme court of Illinois.

The legislature of the State named passed a law making it a criminal offense for any person to purchase or have possession of a car on which the manufacturer's number or identification mark had been removed, defaced, covered, or destroyed. In a prosecution brought under this statute, the accused argued that the statute did not apply to him because when he purchased the car in question he did not know or notice that the maker's

number had been tampered with. The court decided, however, that a conviction under the statute was sustainable without regard to the accused's state of knowledge, the purpose of the law being twofold: (1) To require all purchasers of automobiles to take the indicated precaution before consummating their purchases, and (2) to make it impossible for a thief to hide his crime and market his booty by the elimination of the tell-tale identification marks.

AN UNUSUAL accident occurred in Kentucky recently. Two cars collided at a street intersection. One of the cars was thereby deflected from its course and struck the traffic policeman, who was on duty at the point in question. The court found that the accident was due to the joint negligence of both of the drivers and awarded judgment to the injured policeman against the owners of both cars.

A RECENT Iowa case is to be added to the many decisions referred to in this series on the subject of the special precautions required of motorists to avoid injuring children, notwithstanding negligent and imprudent conduct on the part of the latter.

In the case in question a boy was riding his bicycle on the wrong side of the street and when he unexpectedly got in close proximity to an automobile coming from the opposite direction he became confused, causing a collision in which he was seriously injured. The evidence showed that the car was not being driven at an excessive rate of speed, or otherwise in violation of law, but it also appeared that the driver took it for granted that the boy would have sense enough to get out of the way, and that therefore he did not slacken his speed as he approached the boy. The court held that under all circumstances, having regard especially to the known indiscretion and lack of judgment on the part of the children, the driver of the car should have reduced his speed when he got in close proximity to the boy, and that such a precaution would have avoided the accident; for that reason the motorist was held liable for the boy's injuries.

IN A RECENT case decided in Kentucky it appeared that the guest of a motorist was injured through the collapse of the rear seat of the machine. The owner had no knowledge of any infirmity in the condition of the seat, and, obviously, the defect was of a kind which could have been discovered by the manufacturer of the car before delivery if a proper inspection had been made. The manufacturer was held responsible for the injuries.

THE liability of a motorist who violates the law and, in consequence, injures another is not limited to the bare amount of damages necessary to compensate the injured person. According to a decision just handed down by the Supreme Court of Kentucky, a verdict allowing \$4,000 damages as punitive damages, as well as compensatory damages is sustainable where the motorist was under the influence of liquor at the time of the accident and drove his car in reckless disregard of traffic regulations and the safety of pedestrians, causing injuries of a peculiarly painful as well as permanent nature.

BUT in another case, decided in Iowa, where it was also proved that the motorist was under the influence of liquor at the time of the accident, no damages were awarded to the injured pedestrian, because the evidence showed that the latter stepped from the sidewalk without looking for approaching vehicles, and that he immediately came into collision with the automobile. The basis of this decision is familiar legal rule that a violation of law on part of a motorist does not render him liable for an accident, unless there is a direct connection between the violation of law and the accident—in other words—the accident must have been due to the violation; and not merely have followed or accompanied it.

IN VIEW of the continual increase in the number of machines built on the assembly plan, interest is lent in the recent decisions covering the rules of liability of manufacturers of and dealers in cars for injuries resulting from defective parts not manufactured by the so-called manufacturer of the car.

There seems to be a uniform current of authority in all the States to the effect that the dealer is not responsible for the consequences of defects in parts of which he had no actual knowledge, provided the defects were not so patent upon casual inspection that he could not have failed to notice them when examining the car in the usual course of his business. This freedom from liability, however, is the rule only where there is no express agreement on the subject between the dealer and the purchaser of a car. For example: In a recent decision in California, the dealer gave the purchaser a warranty that the car was "free of defects in material and workmanship". The car did not work satisfactorily, and, when the owner demanded the rescission of his transaction, the dealer refused to give him any satisfaction, claiming that the defects in the car related to its design and construction—the matters of which he said could be complained of only to the manufacturer. But the court decided that the general scope of the dealer's warranty did not admit of such a limitation and that he was compelled to take the machine back and return the purchase money paid.

THE COURTS are likewise agreed that the manufacturer of an automobile, whether sold directly to purchaser or sold through a dealer, is lia-

ble for the consequences of defects in parts which he knew were defective, or which he could have learned were defective had he used reasonable tests before making delivery of the machine. This is true both where the defective part is the product of the manufacturer of the car and also where it is an assembled part. There is a decision of a United States court, however, to the effect that a manufacturer of a car which was sold through a dealer was not liable to the purchaser for an injury sustained as a result of the collapse of a wheel, this unit being one of the assembled parts of the car, although the evidence showed that the defect in the wheel would have been discovered before the delivery of the car if the usual tests had been made. The exemption from liability was sustained upon evidence showing that the manufacturer of the car bought the wheel from a responsible source, upon representations which led him to believe that it was a reliable product.

IN A case in which it was shown that the accident was due to defective spokes in one of the wheels which the manufacturer of the car bought from a reliable maker, the former was held not to be responsible. The evidence showed that the usual tests had been made before the delivery of the car, and that the defects had been obscured by the veneered effect of the coloring materials.

A RECENT Ohio case points a warning for dealers in connection with the sale of cars to persons who have not attained their legal majority. In most States the age of majority for males is twenty-one years. As to females the laws of the different States vary; some fix the age at eighteen, others at twenty-one and a few at twenty-five.

In the case in question a young man under the legal age, but possessed of a considerable personal estate, purchased a pleasure car. He used and abused the machine over a period of some months. Then he offered the machine back to the dealer and demanded the return of the purchase money. The dealer recognized that he was on the defensive and was prepared to take the car back, but he insisted that in making the restitution of the purchase money he should be permitted to deduct the cost of putting the car in proper condition, and the value of the use of it by purchaser. This gave rise to the litigation.

The court decided that the right of a person under age to disaffirm his purchases and secure the return of the purchase money paid by him is not limited by any requirement that he make good any loss that may thus be imposed on the dealer. As the rule of law in question is intended to protect persons of immature years against the imprudent dissipation of their estates, and is supposed to be generally known, the very purpose of the law would be defeated—so the court ruled—and if the purchaser could be compelled to make good the damages resulting from his purchase and subsequent disaffirmance.

The rule of law in question really goes much further than indicated in this de-

cision. If the purchaser of the car—a person under the legal age—had lost the car through fire or theft, or as the result of some accident, he could still have disaffirmed his purchase under the law in force in most states, and could have demanded a refund of the purchase money which he had paid.

ANSWERS TO QUESTIONS.

Q. Would you please publish your advice on the following case. About May 5th a party who was working on the road here brought in his truck for repairs. I found it necessary to have the cylinder block welded and reground, as it was scored very badly. This regrounding necessitated fitting new pistons, along with several parts needed, to put it in first class condition as same were burned out. The amount of the bill was \$180 for parts and \$100 for labor.

I finished repairs on May 18th and when the party came for the truck I would not let him take it away as he had no money to pay the bill. I afterwards found that this party had purchased the truck from Mr. B for \$3000 and had turned in another truck for an allowance of \$1200, which is all that he has paid on it. Mr. B took a mortgage on the truck when he sold it for the balance and had it recorded where he lives, as well as in the place where the party whom I was dealing with lived.

They took court action and have repossessed the truck. They sent a man to get the truck from me and I would not let him have it until my bill was paid. They contend they do not have to pay the bill and also contend they can take it out of my possession. Where do I stand in this matter? The party who brought the truck in to me has nothing, so there is no chance to collect from him. Have I a right to take out parts which I paid for and put in the truck? It seems that as I have the truck in my possession I can hold it until the bill is paid.—G. B. H.

A. Your question concerns which takes priority as a lien claim on the truck, a prior recorded chattel mortgage or your own lien for repairing same? And the answer is that the chattel mortgage becoming a lien before your own, has the first rights. Now, if the truck should be sold for an amount greater than the mortgage charge, you would share in the amount left after the mortgage was satisfied.

Some few states have laws that give a repairman priority in his repair lien over a prior mortgage, on the theory that the mortgage holder, by permitting the mortgagor to retain possession, impliedly gives him authority as his agent to order repairs and other necessary things. Such laws would be a boon to garagemen, besides being eminently just, but unfortunately few states have been able to work out or arrive at such a law.

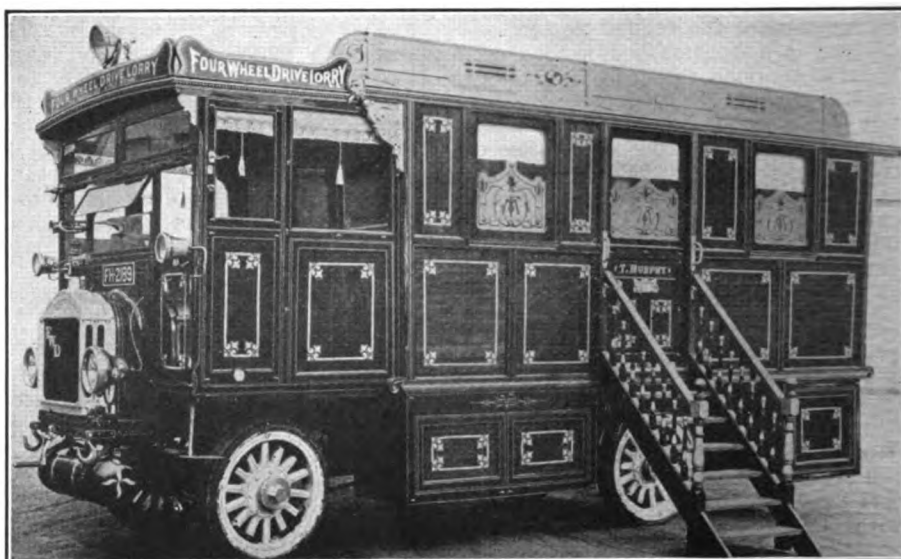
If you have the truck in your possession and you can remove the parts without injury to it, I see no reason why you may not remove them.

I would first suggest that you use all the powers at your command to effect a more satisfactory adjustment, so you will realize on your labor.

SHOWMAN LIVES IN TRUCK

ONE of the most elaborately equipped motor trucks in operation today is that used as living quarters by T. Murphy, traveling show man of London, England. The truck chassis is an FWD, manufactured at Clintonville, Wis. Mounted on this chassis is a van body of special construction which is divided into two rooms that are completely furnished, one for a bed room and the other for a living room. Among the other furnishings the truck contains a piano.

In the construction of the body much solid mahogany is used and the interior is elegantly finished. The cost of the body alone was over £2000.



This Elaborately Constructed Motor Truck Is the Traveling Home of a Prominent British Showman. The Chassis Is an FWD.

MOTOR FLEETS FOR LAUNDRIES

With the laundry business taking on the proportions of a big scale enterprise and using the most up-to-date delivery and equipment, signs are not lacking that the old era of laundering is passing. Not so long ago the words "laundry business" conjured up immediately a vision of a quaint old store with its dilapidated sign in front announcing one

"Wing Lee" as the proprietor—or else the phrase brought up a picture of the "wash lady" of a few years ago who called for the family linen and brought it back, next day, snow white and immaculate.

The modern laundry is more likely to be housed in an impressive building with a modern garage for its business cars—and laundrymen

are not reluctant to admit that the motor car is playing an important part in their growth. As an example of progressive delivery methods, 74 laundries throughout the country operate fleets of three or more Dodge Brothers business cars, while the count of owners of one or two Dodge Brothers cars in laundry service runs into the thousands.

One prominent laundry man, Adrian Otte, of the American Laundry Co., Grand Rapids, Mich., has recently added seven Dodge Brothers business cars to his delivery service. Interestingly enough, Otte still remembers when his whole reliance was a colored boy who made deliveries on foot and just when the spirit happened to move him. And the head of the firm, on rush days, was not above filling his own arms with bundles and carrying the "biled" shirt and linen to the homes of distinction. Otte plans to gradually change over his entire delivery equipment to Dodge Brothers business cars, as is the case with many other laundries who have an opportunity to learn how well the car is adapted to their requirements.

In this connection it is interesting to conjecture what laundries would do without motorized delivery.

HERE'S A REAL ROAD BUILDER



Atterbury Trucks Have Consistently Made Good in the Most Exacting Work and It Appears That This New One Will Follow Precedent.

Acme Makes Good in Road Building

WM. TONKEL, road superintendent of Allen County, Ft. Wayne, Ind., writes: "My experience proves that the Acme is well fitted for our work. It can be depended on to get over the road, deliver its load, and get back in the shortest possible time. Our original Acme truck is approximately 3 years old, and the other two are nearly as old. All three are 3½-tonners. Besides our Acmes we are working four trucks of other makes ranging from ¾ to 3½ tons. In a recent gasoline consuming test the Acmes got 80 miles on 17 gallons, while other 3½-tonners needed 21½ gallons.

THE THING that first made me believe that the Acme was the truck for our work happened some four years ago. There were eight trucks of several different makes building a road at the end of a seven-mile haul, and each truck was handling three yards of gravel to a load. The road was slightly hilly and, in some parts not very good. The Acme was the only truck that could take its load over certain places without shifting gears and the one truck that performed its work in good shape. This performance, I have since learned, is not unusual with Acme trucks.

"Allen County uses its trucks entirely for maintenance and repair work. When new roads are to be constructed, the work is let out under contract. For this maintenance and repair work we decided that a 3½-ton truck would be best, for a five ton truck is too heavy. Our trucks have a 3½ yard body, which is always heaped up, so we carry approximately four yards of stone, weighing approximately five tons. This is something of an overload, but our trucks stand up very well under it. The northern part of Allen County is rather hilly; the rest is fairly flat. Our roads are made of crushed stone, macadam and gravel.

"At present, we are repairing a piece of road 10 miles from Ft. Wayne making a 20-mile round trip. The material is crushed stone, which is delivered at Ft. Wayne in freight cars. The truck is loaded by hand or by chute and run out to the point where the road is being repaired. The driver opens the rear gate three or four inches by loosening a chain. Then he gets into his cab, raises the dump body, and starts the truck so that a stream of crushed stone flows out of the rear end of the body and is distributed evenly along the road. After discharging his load, he returns to town for another.

"It is very easy to make four such trips in a day and, if forced a little, we could make five. However, making four a day we can haul 16 yards of stone per truck to the point. The cost per day on this haul is \$19.26, or \$1.20 per yard and 1.24 cents per yard-mile. If a team were to do this work, it could make only one trip a day hauling two yards of material. A team costs \$6 a day, so it would cost us \$3 per yard to haul stone to this point, against a cost of \$1.20 by truck. Besides, a team could not

spread the stone as the truck does.

"Suppose that, instead of repairing this road, we were building it. It takes 1166 yards of gravel to build a mile of road. Hauling by team and handling two yards gravel per day, it would take us 583 days to perform the work. A truck, handling four yards of gravel to the load or 16 yards a day could do it in 67 days. At the very low cost of \$6 a day for a team, it would cost us \$2208 to haul the material; hauling by truck, at a cost of \$19.26 a day, it would cost us \$1290.37 giving us a saving of \$917.63.

"Building a mile of road that distance from town would cost us by truck \$1.11 per yard, and by team \$1.89 per yard, a saving of 78.7 cents per yard, or 41—6/10%, in favor of the truck. But even though the truck did cost more, it would still pay a road superintendent to use a truck because of the greater amount of material that he could handle in a given time. As in all outside work, it is necessary to make the most of good weather.

"The trucks employed in this service make a very high mileage, averaging from 75 to 90 miles a day. The average for an Acme truck last year was approximately 74.5 miles. The very low fixed expense of 93.3 cents a day is due to the fact that these trucks have no taxes, license, or administrative overhead, and only a low garage and insurance charge. Last winter was very open and we were able to work 285 out of 305 working days. The average cost for the time worked was \$18.37 per day. All our repair charges are lumped, but the \$600 per year allowed is ample.

"Our trucks are run at an average speed of 14 to 15 miles per hour. The Acmes look good on the road and are trucks any county would be proud of."

A. W. McKenna has severed his connection with the Osgood Bradley Car Co., Worcester, Mass. He has not announced his plans for the future as yet.

AVERAGE COST OF 3½-TON ACME TRUCK.

Cost per day (including driver)	\$18.3671
Cost per mile	24.65
Total cost for period	\$5235.28
Operation.	
Days operated	285
Miles traveled	21,235
Miles per day	74.5
Miles per gallon of gas	4.7
Miles per gallon of oil	160
Itemized Cost.	
Driver cost per day (included above)	\$5.35
Depreciation per mile . . . . .	.0428
Maintenance and repair, estimated, per mile . . . . .	.0283
Tire cost, actual, per mile . . . . .	.0335

Credit Merchandising of Automobiles

"THE automobile is the largest unit of merchandise sold today for cash to the individual consumer, because the selling and advertising force behind the marketing of automobiles has outstripped the progress of the credit machinery available to the industry," according to Pierre S. du Pont, chairman of the E. I. du Pont de Nemours & Company.

This thought is interesting when it is remembered that the average family buys food, gas, water, electric light, rent, railroad commutation, and other commodities as they use them. But whereas the average family budget through the utilization of good credit may provide for systematic application of income towards ownership of other necessities, the right to have at one's disposal personal transportation by motor car until recent years has had to be provided for out of capital in a lump sum and paid for in cash in advance of its use.

PIERRE S. DU PONT, who is chairman of E. I. du Pont de Nemours & Company, is also the president of the General Motors Corporation. Mr. du Pont has recently addressed a letter to the 72,000 stockholders of General Motors, which is unique in many respects. It marks quite a departure from the customary communications of corporation executives to their shareholders. The communication in part follows:

"The automobile is the largest unit of merchandise sold for cash to the individual consumer.

"In the early history of the industry, as there was no parallel to follow, motor makers could not profit by the credit merchandising experience of other manufacturers. Today the merchandising of the automobile is upon the threshold of transition from a cash to a credit basis, similar to that through which has passed the merchandising of nearly every other product.

"The selling and advertising force behind the marketing of automobiles has outstripped the progress of the credit machinery available to the industry. To supplement the credits which local bankers have extended to the automobile industry, a group of specialized financing companies entered the field and they have done pioneer work in credit merchandising.

"The General Motors Acceptance Corporation was organized three years ago under the banking law of the State of New York as an associated independent banking institution to provide credit accommodations exclusively for General Motors distributors and dealers and purchasers of General Motors products. The functions of General Motors Acceptance Corporation are to supplement local existing banking facilities, which accomplishes two things: First—that General Motors distributors and dealers, with approved credit standing, are enabled to finance their purchases and sales upon a thoroughly sound banking basis; which in turn means, second—that General Motors Corporation is enabled to sell its products for cash. This necessitates the employment of much less working capital than would be needed were the corporation itself to attempt to extend credits generally.

"At this time of year the desire to buy

automobiles is strongest and the demand by individuals for credit accommodations is greatest. Accommodations under the GMAC plan are available only to those who measure up to proper credit standards. Our stockholders are all concerned in the financial success of General Motors. I am directing attention to the GMAC plan of financing, which has been and will continue to be instrumental in augmenting sales, in order that the stockholders may fully appreciate this important part of our merchandising system. With a clear understanding of this I am confident stockholders can and will cooperate in stimulating sales of our cars, trucks and other products."

Why Specialized Financing?

Certain fundamental conditions, Mr. du Pont says, are peculiar to the merchandising of the automobile, and demand specialized credit and banking service. These conditions may be grouped as follows:

Factories, to build the very best products and sell them for the lowest possible price, must operate at a uniform rate the year round; but the retail sales of automobiles are greater at a certain season than at others. In the spring, when the retail sale of motor cars is the greatest, it would be impossible for the manufacturers to produce sufficient cars to meet the demand. In order, therefore, to manufacture at as even a rate as possible, products must be stored during the season of lower sales, awaiting the season of greater sales. The burden of storing motor vehicles falls upon the distributor and dealer. Sufficient storage space would not be available at the factories, or, if available, the vehicles would not be near enough at hand for the dealer when his market opens up.

The development of the merchandising methods for motor vehicles to include sales on credit is logical, and the practice is growing of retailing on deferred payments; a portion down and the balance distributed over a subsequent period. Provided the credit is extended on a proper basis, this practice becomes a natural development of the market for motor cars.

Purchase by dealers for the purpose of stocking cars and the policy of selling on a deferred payment plan requires larger financial resources than the average

dealer possesses. He must look to other sources for the necessary funds. The local banks are not equipped to handle the specialized credit requirements involved in automobile financing.

General Motors Corporation recognizing that its manufacturing divisions had been hampered by the factors enumerated, organized the General Motors Acceptance Corporation.

The GMAC wholesale and retail plans for financing sales of General Motors products are available throughout the United States, Canada, Great Britain and Ireland. In addition, through its foreign department, the operations extend to every part of the globe where motor cars are used in quantity.

Volume of Sales.

Mr. du Pont, in his letter, points out that the GMAC plan has been an important factor in furthering the sales of the products of General Motors Corporation. It is interesting to note that from inception, early in 1919, to April 1, 1922, there have been financed under the GMAC retail plan 146,937 cars, trucks and tractors, and 102,074 cars, trucks and tractors under the wholesale plan. This does not include other General Motors products financed, nor the operations of the foreign department.

Under the GMAC wholesale plan, General Motors dealers, after credit has been established, may purchase new passenger cars, commercial vehicles and power farm implements by paying a small amount in cash; the balance is payable as the machines are released or at an agreed date after shipment.

Under the GMAC retail plan General Motors merchants may sell a Buick, Cadillac, Chevrolet, Oakland, Oldsmobile, GMC truck, Samson tractor or Delco light system, to customers in good credit standing. The purchaser pays a portion in cash and gives an obligation for the remainder payable in equal monthly installments. In the case of farmers final payment can be arranged to correspond with the sale of his crops.

Here is an example of how the retail plan operates. A man buys a new five-passenger touring car for, say, \$1625 and pays \$625 cash. The balance of \$1000, plus the charges, he pays in, say, 10 equal monthly payments. The GMAC differential, covering interest, investigation, collection and service charges, would be \$56. The purchaser therefore signs a note for \$1056, payable in 10 equal monthly payments of \$105.60 per month. The deferred payments are made by the purchaser direct to the Acceptance Corporation, thus relieving the dealer of collection details.

Rank in the Banking Field.

It will doubtless surprise many people, Mr. du Pont says, even those in the banking field, to learn that General Motors Acceptance Corporation now ranks 120th among banking institutions in the United States from the viewpoint of capital, surplus and undivided profits, and that the Acceptance Corporation loans

(Continued on Page 341.)

Standardization Efforts Approved

MORE THAN most other lines the automobile industry already enjoys the benefits of standardization, because of the activities of the Standards Committee of the Society of Automotive Engineers.

It is indeed natural that an industry, that has contributed to a notable degree to the advancement of the

manufacturing arts, should be among the first to avail itself of the services of the new Division of Simplified Practice of the Department of Commerce, to extend the use of such standards as have already been recommended by the S. A. E., and to develop such others as may now, or from time to time later, appear to be desirable.

REPRESENTATIVES of the Division of Simplified Practice of the Department of Commerce, the Society of Automotive Engineers and the National Automobile Chamber of Commerce, conferred at the headquarters of the Chamber, 366 Madison Ave., New York, Thursday afternoon, June 8, to determine whether there was the occasion or the disposition to invite Government collaboration in the direction of reducing manufacturing costs by the encouraging of unnecessary variations in types and sizes of various parts and accessories, or waste duplication of effort in any direction.

William A. Durgin, chief of the Division of Simplified Practice, explained briefly the policy of the Department of Commerce with respect to the Division of Simplified Practice. It is neither the purpose nor the desire to inflict its offices on any industry, but rather to stand ready to co-operate in putting over any program that may seem for the general good, by lending the weight of the Government's approval.

He believed that only a relatively small percent. of the S. A. E. standards had been put into use, and he thought that perhaps the Department might be able to aid in getting these standards more generally applied.

After an industry has manifested willingness to have help, the second step is for Secretary Hoover to request the trade association of that industry to collect data. Collecting at the Government's request helps the association get it from

non-members, especially, more readily than it might otherwise.

The data collected is made the basis for a conference to which all interested are invited, and when as much as a 95 percent action is obtained on any given standard, the Department of Commerce then recommends that it be put into use, but there is no compulsion. It is simply stated that the Secretary approves the standard and recommends its adoption, subject to periodic revision. The recommendations are followed up to see what proportion of production, for example, is following the proposed practice. This encourages the use of the standards and discloses what ones need revision.

Mr. Durgin likened the Division's position to that of a young lady waiting for a proposal—powerless to make any advances until the industry made the proposal.

F. E. Moscovics, chairman of the committee representing the N. A. C. C., then explained that the industry already is very strong on the matter of standardization, but very willing and, in fact, eager to go farther, hence would welcome assistance to improve wherever it might be possible.

Coker F. Clarkson, representing the Society of Automotive Engineers, explained that that organization has the machinery now, with sub-committees of its standards committee on various subjects, ready to develop desirable standards that may not already be in their quota.

Alfred Reeves remarked the importance of standardization and simplification, especially to the service end of

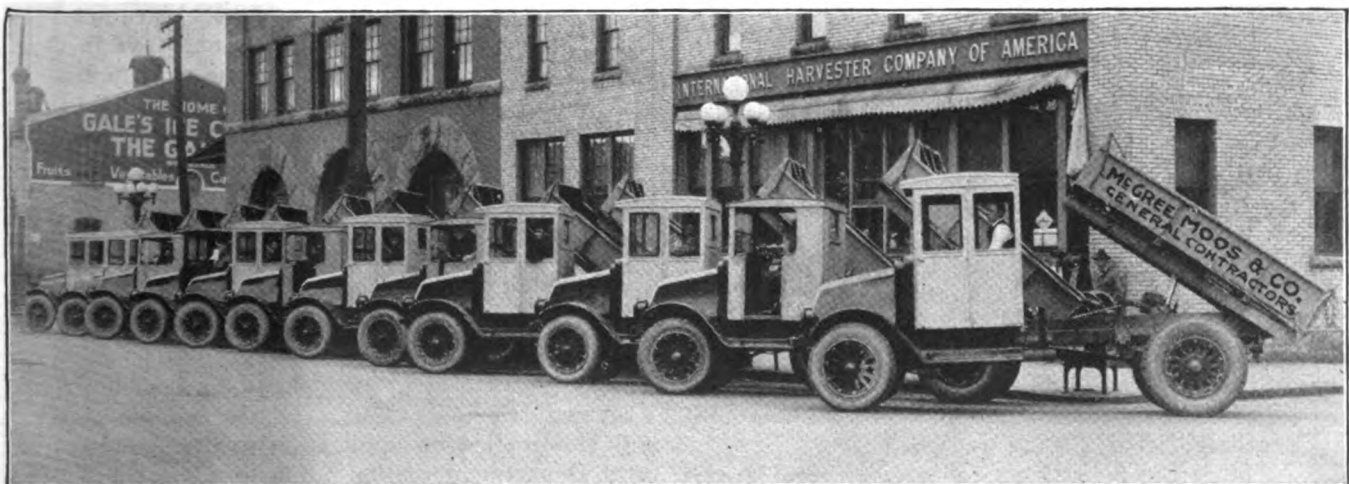
the industry, by minimizing the necessary part stocks that would have to be carried, both at the plant and in the field.

The meeting developed that the industry stands eager to embrace any privileges of this sort that may be extended by the Government and has appointed, as a suitable place and occasion for the next conference on the subject, the S. A. E. meeting at White Sulphur Springs, June 20 to 24. At this meeting, R. M. Hudson of the Division of Simplified Practice, formerly connected with the Franklin Automobile Company, will explain to the Standards Committee meeting, Tuesday, June 20, in general what was explained to this conference, with respect to the policies and attitude of the Division, and what it may be able to do for the industry.

Chairman Moscovics decided that some time later at the White Sulphur Springs meeting there might be a getting together of those interested and, that in the meantime, we might be collecting suggestions as to possible subjects for standardization. The meeting will be called by Coker F. Clarkson of the S. A. E.

Present at the Conference were: William A. Durgin, chief, and R. M. Hudson of the Division of Simplified Practice, Department of Commerce; Coker F. Clarkson, general manager, and Robert S. Burnett, manager of Standards Committee, Society of Automotive Engineers; F. E. Moscovics, D. C. Fenner, C. M. Salisbury, Alfred Reeves, general manager, and H. R. Cobleigh, representing National Automobile Chamber of Commerce.

HEIL HOIST USED BY CONTRACTORS



The Simplified Method of Installing the Heil Hoist, Together with Its Easy Operation, Has Caused Its Adoption by a Great Many Highway Contractors and Others Who Appreciate Its Time and Labor Saving Features.

TRUCK SALESROOM AND SERVICE STATION

A Fire-Proof Four-Story and Basement Structure Equipped with Every Facility for Display, Storage and Restoration and Repair.

THE accompanying drawings illustrate a building that would be suitable for the combination of a sales room and service station. The layout presented is four stories with basement, although a plan for a basement is not shown, owing to the limitation of space and also the fact that no difficulty should present itself in providing for this.

The structure is designed to have 100 feet frontage and 90 feet depth and to be located on a street with a court or drive at the right side to afford egress and ingress of machines.

The basement could be used for storage of a general nature, receiving and shipping room, storage of parts, oils, greases, etc.; a large boiler room and the other units that logically should be located in that part of the structure.

On the street floor, flanking the entire front of the building, is a show and sales room, which has two separate entrances, one on either side of the large central window.

In conjunction with the sales room there is an office for the sales manager, located at the rear of the show room. A toilet for members of the sales organization has also been provided.

There is a passenger elevator running from the basement to the top floor, a stairway from the basement to the top floor, and also a stairway from the show room to the second floor.

At the rear is a general garage section, with an entrance from the court or side street. There is an elevator for hoisting cars to all floors, and alongside of the elevator there extends a stairway from the basement to the room. A wash stand will be found on this floor.

The second floor is devoted partly to the main office, which is located at the front end, directly above the show room. There is a women's toilet in connection with the office. This toilet leads from the waiting room at the head of the stairs. The passenger elevator opens into the waiting room as shown.

Provision has been made for a large stock room, where parts and accessories may be kept on hand at all times, so that the needs of customers for repairs and renewals of equipment may be met as they are developed.

There is a storage space for new cars awaiting owners' call, and adequate area can also be provided for used cars that are for sale. This affords in reality a sub-show room and yet has the utility of a storage department for cars. A large toilet is also in this section. This is lighted and ventilated from a court or light shaft.

The third floor is generally given over to re-

pair work. Here is located the general repair department, where all kinds of work may be done. There is an engine repair section, where engines may be overhauled and tuned up.

An electrical department is also illustrated, where batteries, magnetos, etc., may be rebuilt or repaired.

At the rear of this floor are three units that form the heart of the service departments. These are the machine shop, the forging department and the welding section.

A tool room has been shown in connection with the machine shop. By having a system of record of the issuance of all of the tools and that will necessitate their return to the tool room when the workmen are through with them, excessive losses of tools can be avoided. A toilet and a wash stand are shown.

The entire fourth floor is turned over to the finishing department. This floor has a wood working section, a trim department, where all kinds of leather work is done; a general paint shop, two varnish rooms and one enamel room.

The general paint shop occupies the larger portion of the floor. Immediately at the rear of this floor are located the varnish and enamel rooms.

The construction is of reinforced concrete throughout, with brick, granite or artificial stone. The same treatment as that of the trimmings for the first story is to be used for the manufacture of the cornice and inserts in same.

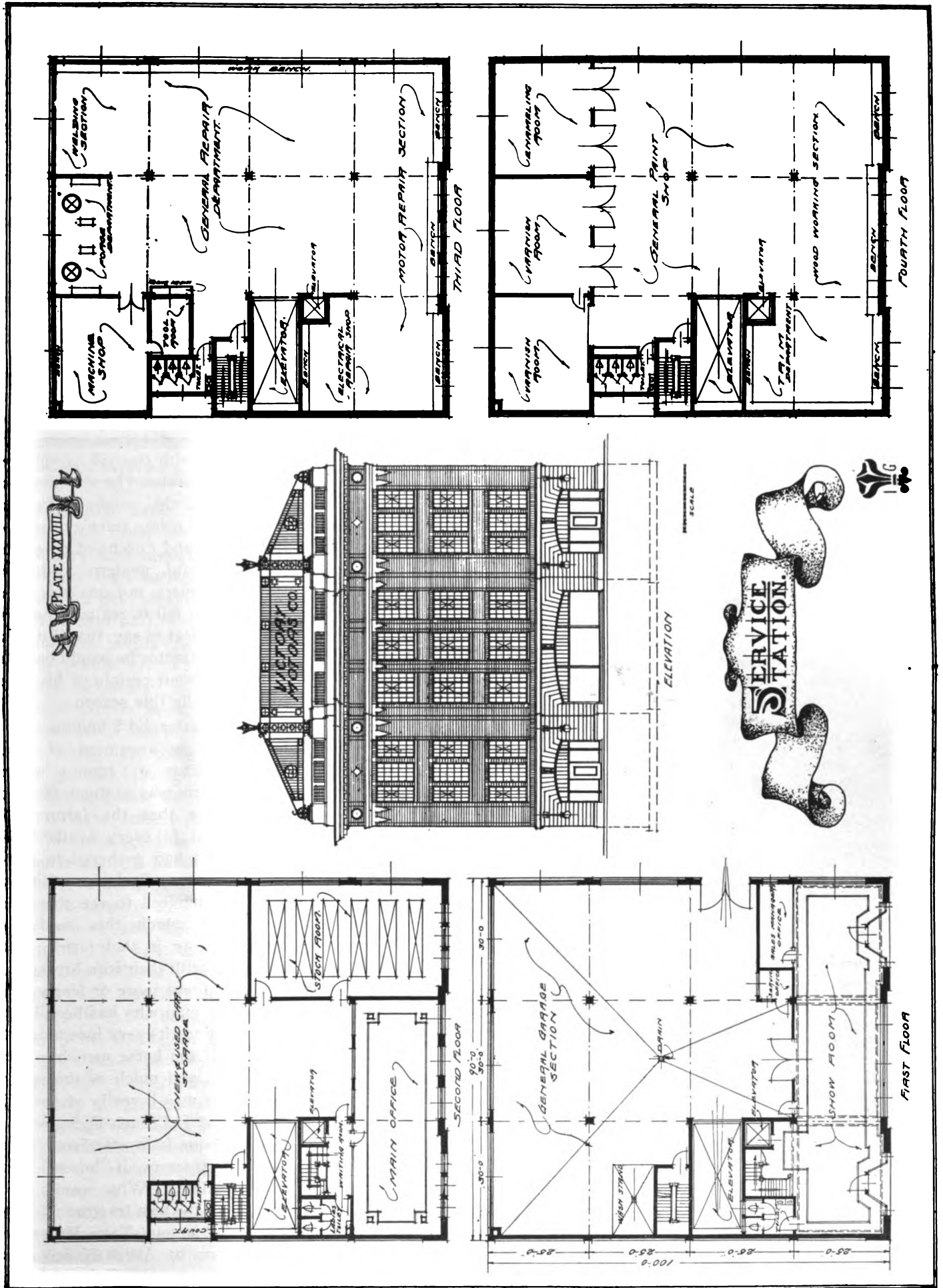
Electric lamps have been placed on either side of the entrance doors, adding much to the appearance and greatly conveniencing ingress and egress at night. A large sign has been incorporated into the design, something just a little different from most signs.

Instead of the unsightly, common place steel frame, an endeavor has been made to weave in a little refinement, and, therefore, the ornamental iron frame work shown. Exceptional individuality may be attained in this respect, and it is believed greater consideration should be given such projects. The cost is a little more, but is well worth it.

The building is fireproof. Steel sash, wire glass, metal doors, etc., are used throughout, complying with the fire prevention laws.

The cost of such a structure would be from \$60,000 to \$75,000.

Any further information relative to this plan will be supplied on application to the Architectural Department of this publication.



They Raise 'em—Why Don't They Use 'em?

World Famous Stock Breeders with Horses and Mules at Their Disposal Rely on the Internal Combustion Engine for Necessary Power in Farming Operations.

THERE has been so much said and written concerning the relative value of the horse and the tractor on the farms of the Nation; there have been so many truths and untruths stated; there has been so much representation and misrepresentation; so much truthful, honest comparison and so much

spleen and vituperation from both the horse and tractor camps that, in order to be thoroughly satisfied on the subject, it seems that one should either conduct his own investigation or accept the investigation of some reliable, responsible agency that will present the facts in the case exactly as they exist today.

POSSESSING a somewhat more or less intimate knowledge of the manifest and manifold advantages of the modern farm tractor, the writer has never been able to reconcile some of the statements which have been made against it. Statements purporting to be facts have been given wide circulation and a number of new influences have been brought against the

horse, for it is intended merely to deliver power at a time when power is essential and, in order to check up the use of tractors, the number in use, the work they are accomplishing, the economies with which they are accomplishing the work, the writer made a special and an extended trip through one of the best farming, and, incidentally, through one of the best

Attica to Lafayette. Everywhere it seemed tractors were running on every hand. In field after field they would be doing the plowing while the harrowing and discing, or possibly the planting, was being carried on with the aid of splendid horses and mules. In a community near Westfield, eight adjoining farms were using tractors, and, of the dozens and dozens of enterprising, successful, modern, up-to-date Indiana farmers, not one was there who did not fail to realize, and who did not neglect to say, that if it were not for the tractor he would be compelled to permit certain of his acres to remain idle this season.

In no quarter did I find an opportunity for an argument of horse versus tractor or tractor versus horse. There was so much need for farm power that the farmer had reached out in every available direction and had gathered in every pound of power he had, and it was interesting indeed to see these fine teams, for which this section is justly famous, in their attempts to keep pace with their iron brothers.

The trip was more or less a revelation to a man who has been in the industry since its very inception. All the talk of the horse men has come to naught, and much of the talk of the tractor men is really of no avail.

Why did J. Crouch & Son of the world famous Lafayette Stock Farm turn to tractors if horses were more efficient? Why would there be three of the best tractors made on the world famous Nave Horse and Mule Farm at Attica if horses or mules were more efficient? Why



At the Stock Farm of J. Crouch & Sons It Formerly Required a Veritable Army to Accomplish Work Now Done by This Tractor and a Few Men with Teams.

farmer turning to this more modern, more economical and more practical method of farm tillage. The agency back of this has been well organized and has done its work well until a number of people, who are scarcely interested in either have been compelled to form an opinion detrimental to the tractor industry.

The tractor industry is not in competition with the horse, and the man who sells his tractor on this basis is not selling it wisely. The tractor is more readily and more honestly a supplement to the

tractor states, throughout the weeks of May 8th and 15th. He motored from Florida, Indiana, to Rossville, Clarks Hill, Marshfield, Lebanon and back to Lafayette over a road lying farther east. From Lafayette we drove the Jackson Highway to Indianapolis, via Frankfort, Sheridan and Westfield, thence south through Greenwood, Franklin, Edinburg, Columbus and Jonesville, and back to Indianapolis, thence directly northwest, as the crow flies, back through Hillsboro and through

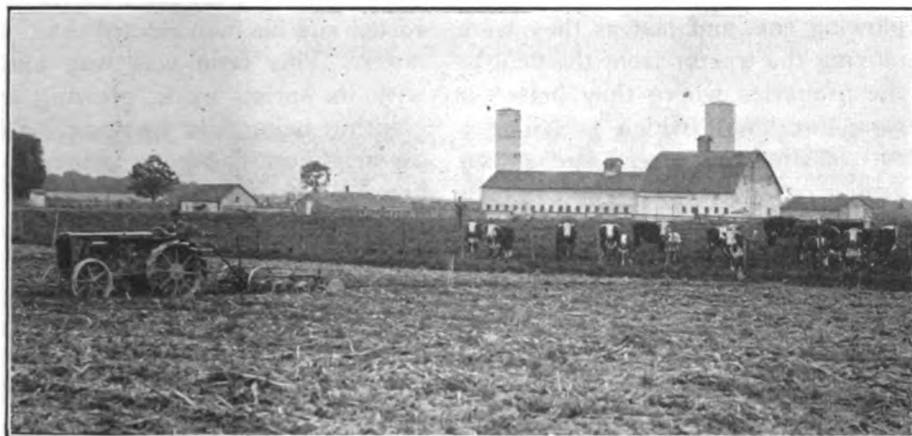
did Roy Graham, of Franklin, Indiana, permit 29 head of prize-winning horses to stand idle in the county fair ground stables and use a tractor unless the tractor was more efficient? The list goes on and on,

six-horse team in the Chicago International. He says he still loves horses, "but what a shame to abuse them in this kind of field work."

Crouch farm is now given over to the raising of Hereford cattle and

Smith, the proprietor of the farm, says that with one tractor he plowed 110 acres and double-disked 130 acres in 105 hours, and wants to know how, ever again, he could be induced to use horses for this gruelling work. At another time this same tractor plowed 16½ acres of corn ground on 33 gallons of kerosene. There is no such thing as this splendid concern even ever contemplating the return to straight horse farming though a very great deal of the lighter work about the place is carried on by horses and mules. F. M. Nave was, at one time, and not so long ago, President of the Percheron Horse Society of America, yet he has seen the light, and, when it comes to extensive farming, he has felt the need of the modern method and has called upon tractors with which to accomplish it. There are six sets of improvements on this farm, and some of the farms are still devoted to the raising of horses and mules. One farm has a splendid herd of Hereford cattle of the exclusive Van Natta strain, while another farm is devoted to sheep, all registered Shropshires, and the tractor is vitally essential in the successful conduct of the affairs of this splendid farm group.

Roy Graham, Franklin, Indiana, is recognized as one of the leading horse breeders of America. For



The Cattle Barns on J. Crouch & Sons World Famous Lafayette Stock Farm—Hereford and Hampshire Hogs Have Taken the Place of High Priced Horses.

Rusch-Hill, Espy Brothers, Kate Opp, and other well-known horse breeders have turned to the tractor to carry their spring peak load demand for field power.

The firm of J. Crouch & Son at Lafayette needs no introduction. The senior Mr. Crouch was for years secretary of the German Coach Horse Society of America. More than 35,000 pure bred stallions and mares have come to the American market through their stables. Lafayette Stock Farm is the home of William, fastest pacing horse in the world since Dan Patch's death. This is also the home of Wilgo, the 2:07¼ trotting stallion. The Crouch farm is known throughout the world and during the horse days of long ago, they maintained branch offices in every important center and had a small army of buyers in every horse-raising market in the world. In Belgium, the breeder never put a price on his horse until the Crouches had made a bid for it. Horses came to Lafayette farm in shiploads and their wonderful barns house many titled mares and stallions today.

Boone W. Yoder, the world's gold medal champion six and seven horse team driver, is manager of the Crouch farm. When the Crouch six-horse team was broken up, Mr. Yoder drove the Thomas Wilson

Hampshire hogs. Since this new undertaking took form, not less than 5,000 or 6,000 Herefords and limitless hundreds of beautiful Hampshires have been bred, raised and disposed of. Mr. Crouch is still a horse lover. He has made a vast fortune out of horses, but this does not preclude the use of tractors on beautiful 900-acre Lafayette Stock Farm.

The most glowing example of the conversion of horse men to tractor economies is found at the famous Nave Horse and Mule Farm at At-



The Hog Lot at the Nave Horse and Mule Farm, Attica, Ind. Manager Smith is so Proud of His Tractor and Hogs That He Pictures Them Together.

tica, Indiana. There are three tractors here. The farm comprises 1750 acres and is now devoted to Herefords and Duroc fancy hogs. Though they wintered 43 head of fancy horses and mules, Ernest L.

years he was field representative of the Belgium Horse Registry Association of America and traveled extensively, almost continuously, throughout the United States and Canada, in the interests of that organization.

Roy Graham is a horse man, known to more people personally than any other horse man in the business. Though he had, on May 11th, 29 head of fancy Percherons and Belgians standing in their stalls at his stables in Franklin, Mr. Graham was in the field superintending the work of his tractor. Mr. Graham is the owner of William Tell, Jr., the greatest 2-year old Jack the horse industry has ever known. He has a standing offer of \$2500.00 for this Jack; 14 hands 3 inches high, and acknowledged everywhere as the premier animal of its kind in existence. Mr. Graham is getting out of the horse business as fast as he can dispose of his animals, and is going into the hog business on Whiteland Stock Farm near Franklin. His faith in the tractor is more than justified when he was able to plow 11 acres in an even 10 hours with a 15-25 tractor the day before the writer called on him. This party has two farm trucks, in addition to his tractor equipment, hence it will be seen that he is using mechanical power almost to the exclusion of horse-flesh power. As an official of the Belgian Society, there is probably nothing about horses and their capacities, their virtues and farm values, he does not know. Ask him what he thinks about the successful farm tractor.

One of the most interesting stock farms in the Wabash River bottom section of Indiana is the Rusch-Hill Farm, owned jointly by Dr. E. B. Ruschli, probably the leading surgeon in Indiana, and "Jim" Hill, formerly a branch sales manager for J. Crouch & Son. Who is there to say that "Jim" Hill is not a successful horse man, or that he is not partial to horses if they can serve his farm interest better than any other kind of power? Rusch-Hill has abandoned horses completely for heavy field work and has turned to the tractor. They are feeding fancy stock, cattle, hogs and sheep, Short-horns, Spotted Poland Chinas and Shropshires. While this farm exhibited the sweepstake team of Percheron mares at an event during a recent Indiana State Fair, (for all I

know they have this same team on hand), I didn't see them, nor did I see a single horse in the field where the tractor was at work, on the occasion of my visit. I did arrive at the field at the moment they had completed a continuous 38-hour plowing run, and just as they were moving the tractor from the field to the granaries where they belted it to a line shaft, which propelled a corn sheller at one end and a feed grinder at the other. The ear corn was being "hoppered" into the sheller and the shelled corn "hoppered" into the grinder; a man was shoveling oats into the grinder and there was the tractor grinding mixed feed for the stock on the farm at the rate of a bushel a minute, using a 10 inch mill. While this was in progress the writer had to leave, but was told by Mr. Hill that immediately he had a few days' feed ahead the tractor would be backed out and taken into the field and the night man put on to it. Rusch-Hill does not let night time stand in the way of accomplishment. The tractor is equipped with an acetylene light and two men divide responsibility and the hours of work. Mr. Hill's remark was that he had had some mighty good horses in his day but he had never had a team capable of doing these things, and he says he knows of three different and distinct ways in which his tractor will pay for itself this season, and still he may be counted upon as one of the best friends the horse and the horse industry ever had.

Richard Fisher, Columbus, Ind., is a Poland China hog man and a tractor man, too. He farms 457 acres and does it with mixed power, tractor and mule. He keeps 10 fine mules for row work, haying and other tasks where possibly horse flesh is more mobile, for plowing out corners, cultivating and yard work. If Mr. Fisher had never been completely sold on the tractor until this season his experience in this spring's work certainly established his machine firmly in his highest regard. In plowing out a bad corner next to his orchard, a hired man and a three-mule team undertook to

match Mr. Fisher's tractor plowing depth in order to secure uniform work throughout the field. The mules were unable to accomplish this, so it was either another mule and a four-horse hitch or quit the job and finish with the tractor. Mr. Fisher and his man elected to do the latter. This farm was way ahead with its spring work, plowing and planting being laid by long before his neighbors had gotten their corn ground plowed. He let his mules run in the pasture while he plowed at the rate of 11 acres per 10-hour day, and his accomplishment was such that attracted the attention not only of his neighbors, but the Columbus Evening Republican had the following item in its issue following the completion of Mr. Fisher's work:

"William Fisher, southwest of the city, made quite a record this week plowing on his farm. Mr. Fisher used an Allis-Chalmers tractor, pulling two 14-inch bottom plows, and plowed 11 acres in 10 hours, which is considered quite unusual.

"The work was done thoroughly and had the same amount of work been done by men with teams, it would have required four men with 16 head of mules and four plows to have completed the task in the same length of time and plowing to the same depth.

"The work done by Mr. Fisher speaks well of the modern system of plowing and according to figures on the work is much cheaper."

Manor Hill Stock Farm, sometimes known as South River Farm, is a 220-acre farm devoted exclusively to the breeding of pure bred fancy cattle, big type Poland Chinas and Hampshire hogs. The farm is owned and operated by Kate Opp, assisted by her son-in-law, John Burns. Manor Hill has long been known as one of the leading stock farms of this section, in fact, it has produced the best of dairy cattle for a matter of perhaps 50 years. It is merely another case of tough spring plowing made easy the tractor way. Manor Hill is known the world over as the most successful stock farm

(Continued on Page 341.)

Executives Discuss Problems Underlying Highway Transport

Road Builders and Motor Manufacturers Convene at Washington for First Meeting of Series That May Have Important Bearing on Legislation.

WASHINGTON, D. C., June 12.—Representatives of the American Association of State Highway Officials, the National Automobile Chamber of Commerce and the Bureau of Public Roads met in Washington at the federal bureau May 24 to discuss important matters relating to highways and highway transport. The meeting was the first of a series which, it is expected, will eventually lead to conclusions which will have an important bearing on legislation relative to these subjects.

The Honorable Henry Wallace, secretary of agriculture, was the guest of honor at an informal luncheon during the day.

The American Association of State Highway Officials was represented by W. D. Uhler, chief engineer, State Highway Department, Pennsylvania; George P. Cleman, state highway commissioner of Virginia; John N. Mackall, chief engineer and chairman, State Roads Commission, Maryland; John H. Mullen, deputy chief engineer of Minnesota, and Charles J. Bennett, highway commissioner, Connecticut. In addition to these men who with T. H. MacDonald of the federal bureau comprised the formal committee representing the association, several members of the executive committee were present, including C. M. Babcock, commissioner of highways, Minnesota, and president of the association; Austin B. Fletcher, director of public works, California; Fred R. White, chief engineer, Iowa; Paul D. Sargent, chief engineer, Maine; R. J. Windrow, consulting engineer, Missouri, and W. C. Markham, secretary of the association, Kansas.

The National Automobile Chamber of Commerce was represented by Roy D. Chapin, chairman, president of the Hudson Motor Company; Windsor T. White, chairman of the board, White Motor Company; A. J. Brosseau, president Mack Trucks, Incorporated; George M. Graham, vice president Chandler Motor Car Company; Alvan Macauley, president Packard Motor Car Company, and Pyke Johnson, Washington representative.

The Bureau of Public Roads was represented by T. H. MacDonald, chief; John Wilson, chief engineer; A. T. Goldbeck, chief, division of tests, and C. D. Curtiss, assistant to the chief.

W. K. Hatt, director of the highway advisory board of the National Research Council, also participated.

The conference decided to select those subjects which are of immediate importance in the highway transport field such as broad questions of highway finance, regulation and operation, to report back to its members and later to gather for further detailed discussions. No definite

time was set for the next meeting, but sentiment of those present favored a two-day session within the next month or two.

TRANSPORT SALES SURPASS ALL RECORDS.

MT. PLEASANT, MICH., June 12.—Transport Truck Company reports that the total number of orders placed by distributors for April delivery topped the record of any corresponding month in previous years of Transport history.

"We are certainly glad," says President M. A. Holmes, "that our factory facilities are such that we can keep production apace with sales; for that is our most important task right now. Our 1922 complete line of trucks ranging from 2000 pounds to 10,000 pounds service has had a reception justifying our highest expectations.

"The pronounced upward curve of business in all lines calls for the motor truck as a prime essential of transportation. We have anticipated this all along, and by factory expansion, and the expansion of our line to include a truck specialized for every trucking service find ourselves good and ready for the increasingly heavy demand.

"There is no better barometer of general business conditions. When modern business moves it must move on trucks. There is every reason, therefore, to pre-

WANT BUSES IN PLACE OF TROLLEY SERVICE.

NEW YORK, June 15.—A suggestion has been made that the surface cars on Broadway be removed and that busses be substituted in their place. It has been stated that the operation of surface cars not only works to the disadvantage of those with property and business on Broadway, but serves to retard and interfere with other models of vehicular traffic.

The association asked that it receive an opportunity later on to offer information and arguments showing the need for better surface transportation on Broadway, the advantages of modern bus service over the street car, the advantages enjoyed by other cities where only motor busses are used on busy thoroughfares, and to submit comparative costs between the two methods of transportation.

It was stated that the operation of motor busses might be undertaken by the New York Railways Co., and its receivers which holds the Broadway franchise.

pare for the utmost activity in every line of manufacture, construction work, wholesale and retail selling, production and distribution to meet immediate needs everywhere.

"We have kept the faith. Our factory built and thoroughly equipped for the exclusive production of motor trucks has been in operation every working day of its history. Right through the last year we have maintained our sales force and built up our roll of distributors. The impetus that business is feeling now finds us well prepared."

BRIDGEPORT TRUCK CO. BUILDS BUS JOB.

BRIDGEPORT, CONN., June 12.—The Bridgeport Motor Truck Corporation has recently paced on the market a truck chassis specially built for the motor bus purpose, being of light construction, high powered motor and extra heavy rear end. It is known as the Model AA.

The company furnishes this chassis any required length up to 17 feet and states that it is in position to compete with the average truck manufacturer in supplying a chassis adopted for this kind of work.

An announcement from this concern states that the bus situation has been looking prosperous for some time and good business is looked forward to by the management.

HALF MILLION MORE FOR FOREST HIGHWAYS.

WASHINGTON, D. C., June 14.—Expenditures totaling \$586,000 of National Forest Highway funds for the construction of 106 miles of roads in Colorado have just been approved by Secretary of Agriculture Wallace. This money was made available for roads of primary importance to the state, counties or communities within, adjoining or adjacent to the National Forests.

Eight projects have been approved for construction. Seven and one-half miles of the Berthoud Pass road will be completed at a cost of \$140,000, while \$26,000 will be expended in the elimination of switchbacks on the Durango-Silverton road and in surfacing poor sections. One hundred thousand dollars will be expended upon the Red Mountain project to which the state will build an adjoining section.

Twelve miles of the Cumbres Pass road, located in Conejos County, will be completed at a cost of \$130,000 with the county constructing a cooperative section. Twenty thousand dollars will be appropriated by the State to increase the \$60,000 Federal fund required to construct 15 miles of the Hardscrabble road located in Custer County. Three and one-half miles of the Independence Pass road, ending at Curtiss Hill, will be completed at a cost of \$35,000. A project 5½ miles in length over Cameron Pass will be built for \$71,000. Forty-five thousand dollars will be expended in the construction of the Arapaho Glacier road located in Boulder County.

Allyne-Zeder Company Absorbs Cleveland Tractor Company

Newly Incorporated Concern Will Manufacture Zeder Automobile, Cletrac
Tractor and One-Ton Truck of Advanced Design

Engineered by R. H. White.

CLEVELAND, OHIO, June 5.—The Cleveland Tractor Co., makers of Cletracs, will be reorganized as the Allyne-Zeder Motors Company to manufacture and market the new six-cylinder car which is being designed by F. M. Zeder, formerly chief engineer of the Willys Corporation and the Studebaker Corporation. The reorganization will be brought about by adding approximately \$5,000,000 of new capital to the present assets of the Cleveland Tractor Co., resulting in a corporation with a capital of \$10,000,000 of preferred stock and 200 shares of no par common stock. It is not expected that there will be a public offering of the new stock, as the entire issue will be taken by private subscription.

A new corporation, subsidiary to the Allyne-Zeder Motors Company, will be organized under the name of the Cleveland Tractor Company and will continue the marketing of Cletracs through its present distributors and dealers. A new one-ton truck, embodying advanced details in design, engineered by Rollin H. White, will be added to the Cletrac line in the near future. The reorganization plan is practically ready for submission to the stockholders of the Cleveland Tractor Company, and the cooperation of several of the larger stockholders practically assure its adoption. E. E. Allyne, second largest stockholder in the tractor company, whose name is included in that of the new company, is a director of the Aluminum Manufacturers, Incorporated.

The Allyne-Zeder Company will bring back to the automotive industry two members of the Studebaker family who have been prime movers in the reorganization. They are Clement Studebaker, Jr., and his brother, Col. George M. Studebaker. Both formerly were directors of the Studebaker Corporation and they are the controlling factors in the Citizens National Bank of South Bend. Both have other large financial interests. Clement Studebaker will be chairman of the board and his brother vice-president. Rollin H. White, president of the Cleveland Tractor Company and a director of the Aluminum Manufacturers, Incorporated, will be president of the new corporation.

Hodgkins to Direct Sales.

The other officers will be R. T. Hodgkins, general sales manager of the Cleveland Tractor Company, vice-president; A. F. Knobloch, works manager of the Cleveland Tractor Company, vice-president and works manager; F. M. Zeder, vice-president and chief engineer; C. D. Fleming, treasurer of the Cleveland Tractor Company, treasurer; E. B. Wilson,

formerly sales manager of the Willys Corporation, general motor car sales manager; O. R. Skelton, formerly in the engineering departments of the Willys and Studebaker corporations and the Packard Company, assistant chief engineer; Carl Breer, formerly in the engineering departments of the Willys and Studebaker corporations, assistant chief engineer. J. O. Hahn, formerly branch manager in several cities for the Studebaker Corporation, also will be associated with the company.

The Cleveland Tractor Company is an Ohio corporation with a capital of \$6,000,000. It owns a large plant in Cleveland where Cletracs have been turned out for more than five years. Its tractors are being used successfully in 65 countries throughout the world and present production is being rapidly increased to take care of orders on hand. The balance sheet of the reorganized company, based upon appraisals made this year, shows total net assets of approximately \$10,325,000, of which about half will be available for plant extensions and for working capital. The other half will be permanent in assets. The present plant facilities and shop organization will make it possible to proceed with the manufacture of the new Zeder with a comparatively small expenditure.

CONFIDENT THAT STEEL DEMAND WILL CONTINUE.

PITTSBURGH, June 12.—Steel makers, here and elsewhere, are confident of a continued demand for their products through the rest of the year; the demand likely expanding with the appearance of 1923. There is confidence of higher prices in view of this belief. Furthermore, manufacturers point out, the coal strike has been instrumental in increasing production costs.

It is declared the industry would be operating virtually at normal but for the coal strike.

OFFERS BUS OPERATION AT 7½ CENT FARE.

ROCKFORD, ILL., June 14.—T. J. Fay, who has been operating busses in this city and suburban towns for many years, is now endeavoring to interest Moline and Rock Island authorities in a similar line. He is said to have offered to operate a line of busses connecting the two cities upon the standard basis of a 7½ cent fare. It is stated the commissioners are interested in Fay's proposition and will consider it thoroughly.

erating virtually at normal but for the coal strike. Independent interests forecast an appreciable improvement in the coal situation by July 1, in the non-union fields, but anticipate a long drawn fight in the union regions. Some of the larger industrial consumers predict that the union mines may not get under way before October 1.

Railroad requirements are affording a big outlet for steel products, both for rehabilitation and new equipment, including cars, locomotives, rails, bridges, track fastenings and the like.

With the resumption of additional open hearth furnaces and the last of the group of three blast furnaces, the Carnegie Steel plant at Farrell will operate at between 90 and 100 per cent capacity. The departments, which are still idle, are the skelp mill and three batteries of coke ovens. About 1000 additional men are employed by the starting of other departments. With the sheet and tinplate mills of the American Sheet and Tinplate Company and the works of the American Steel and Wire Company in practically full operation, approximately 6000 men are employed in Farrell alone. This is the first time in nearly a year and a half that the steel corporation plants have operated so near full capacity.

Encouraging news has been given out by the Wheeling Steel Corporation this week concerning operations of its mills in the Wheeling district. Two plants of the Wheeling-Glessner Company, a subsidiary of the Wheeling Steel Corporation, will be working to full capacity by next week, one of them having been put on in full this week and the other, the Laughlin sheet mill in Martin's Ferry, will go on in full Monday morning. The Creek mill, in East Wheeling, has been working to capacity this week.

Sheet bars will probably continue at \$35 through July, at least to regular customers. Republic Iron and Steel has named this price, but has surplus tonnage for the merchant trade. Its own needs and those of its regular customers will largely require its capacity. Irregular buyers of sheet bars will have to pay a higher price. One Mahoning Valley maker predicts that sheet bars may go to \$40 before the end of the third quarter, and looks for a \$37.50 price to apply on considerable tonnage.

Prices on sheets show some variations, ranging on black from \$3.30 per 100 pounds to \$3.50, with a proportionate differential for galvanized. A number of interests are well sold ahead on galvanized grades. Blye annealed sheets range from \$2.40 to \$2.75.

The Newton Steel Company announces a \$5 a ton advance on No. 22 gauge auto body sheets for third quarter delivery, bringing the price to \$4.75. This compares with \$4.50, which applied on much second quarter tonnage of this grade, though a considerable tonnage was rolled at \$4.35.

Pressure for all full finished sheets is strong and representatives of buyers, including, particularly, auto and body companies and warehouse interests, are visiting the district regularly in an endeavor to obtain material.

Five Thousand New Yorkers Apply for Drivers' Licenses in Week

Many Requesting Permit Are New Vehicle Owners—Other States Also Show Great Gain—Massachusetts Receives Fees Totaling Four Million.

NEW YORK, June 14.—A new record of 4,464 applications to drive motor vehicles in this city was established during the last week of May at the Motor Vehicle Bureau, Broadway and Sixty-fifth Street. On May 27, a new record for a single day was set with 1,044 license applications. The actual numbers for the six days beginning May 22 were 770, 798, 364, 1,044, 638 and 300, respectively.

"The New York Bureau," said John McNeill, who was in charge of the office, "has been almost swamped with applications for operators' and chauffeurs' licenses for the last month. It is unprecedented. These new daily and weekly records were all original applications to drive cars, no renewals being among them. Some were for the year beginning July 1, for on that date the new individual license year begins, the car registrations year remaining at January 1. The larger number, however, were for the remainder of the current year, and on July 1, these new applicants will obtain renewal licenses."

While statistics as to the proportion of private operators and chauffeurs are not yet available, it was estimated that, of the new record number, about 40 per cent represented chauffeurs. With the increasing tendency on the part of the officials in this State, and very notably in New Jersey, to stop motorists at unexpected times and ask to see the operator's card, application for driving licenses from two or more members of one family has become more general. It is also interesting to note that, as a result of the change in the motor vehicle law whereby the revocation of driving licenses can be more summarily accomplished than formerly, the revocations in the metropolitan area have recently averaged from two to three a day.

From the non-tabulated figures at the local bureau, Mr. McNeill estimates that operators' licenses have been issued to from 150,000 to 155,000 persons in the five city burroughs and probably 175,000 chauffeurs. The official statistics of June 30, 1921, gave a total of 127,000 chauffeurs for all of New York City and 124,928 operators. The yearly increase, therefore, has been considerable.

Looking at these figures from another angle, they indicate not only that more persons than ever are driving cars in and around the metropolis, but that there has also been a very substantial buying of motor vehicles. Many motorists have found this out to their disappointment within the last month. Fully half a dozen popular makes of cars might be mentioned that are practically out of the New York market, that is, in so far as regards the ability to obtain quick delivery.

In the salesroom of one of the higher-priced cars recently it was stated that 500 unfilled orders were on the books and there were only four models for sale on the floor.

Sedans of some of the popular makes are practically unobtainable, notwithstanding the urgent requests for additional supplies from the factories. Open touring cars are also in great demand, and in these models, deliveries of several standard makes as much behind. Some factories have found that, as a result of the trade slump last season, they were a trifle too conservative in production schedules for this year and the manager of one very popular car said that 2000 more cars could readily be sold here if the factory was able to supply them. As it is, the 1922 allotment is closed out.

Reports from many factories indicate that the season has been a big one for sales in practically every part of the country. Employment in Detroit is stated to have increased 43 per cent, since January 1. Many plants are doing their utmost to speed up production. The Ford plant is turning out nearly 5,000 cars a day, and on May 16 established a new daily record when 4,878 cars were completed. The May production was about 130,000, and 140,000 cars are scheduled for June. A statement from the factory announced that Ford dealers have asked for 194,750 passenger cars and trucks for June. The Cadillac plant made a new daily record last month in turning out 150 cars within twenty-four hours; the Franklin Com-

UNSETTLED BUS SITUATION AT NEW ORLEANS.

NEW ORLEANS, June 15.—The affairs of the Homefolks Company, organized last winter to provide bus transportation, has been taken over by L. J. Folse, a shipping agent and stockholder in the company. He has not as yet announced whether more stock will be offered or the company assets liquidated. The managing director, who first organized the company, retired at the request of the stock holders. It is stated only one bus was bought, while the announcement was made that 100 would be bought. The manufacturer of the busses, through its agent, contracted to take stock to the amount of his commission, which played a considerable part in the announcement that \$126,000 worth of stock had been sold. The trolleys are as unpopular as ever, despite the fact that an agreement has been reached between them and the city government.

pany reported that more cars were made in May than in any previous month. John N. Willys, at a recent dealers' convention, said that deliveries of Overland cars were 18,000 behind and that production, late in May, exceeded 500 cars per day. Jordan announced a May record with 1,000 cars, and the Moon reported the biggest month in its history. Conditions equally as good might be mentioned for several other concerns.

Further illustrations of the motor vehicle activity are provided in the registration statistics just provided for the first five months of the current year in Massachusetts, which surpassed all former records for a similar period. In that time there were registered in Massachusetts 341,200 cars and trucks, of which 285,926 were passenger vehicles. The 1921 figures for the five months were 279,436 cars of all kinds. This year's increase, therefore, represents more than 60,000 cars. During the same period, 33,807 original licenses were issued, an increase over the former year of 6,554 or more than 24 per cent. This indicates that more persons bought cars for the first time this season. Renewals also showed a substantial increase. Fees thus far contributed by Massachusetts' motorists to the State aggregate \$4,189,667, an increase of more than \$668,000 over the corresponding period of a year ago.

MEXICO ENCOURAGES MOTOR TRANSPORT.

NEW YORK, June 12.—"The business man in Mexico, as in the United States, has come to feel that the automobile is a necessity. This statement, by the official organ of the American chamber of commerce in Mexico City, appears to be in line with the policy of the Mexican Government, which, for quite some time, has regarded the automobile and motor truck as pre-requisite to proper development of the country's resources.

This appreciation of the car's utility is emphasized by the suppression, through presidential decree, of import duties, despite the general need for revenue. Similarly, governors in certain provinces have urged that the taxes on motor vehicles be kept low.

Even in matters of organizing of automobile shows and fostering of highway projects, official interest has been taken. As result, several shows have already been held in Mexico City and a national highway proposed to traverse the entire country.

Imports of American motor vehicles into Mexico consisting of 6,750 cars and 1,482 trucks showed an increase in 1921, compared with the preceding year. Shipments may be expected to be even greater than this this year as automobiles, in view of government attitude, are sure to contribute considerably in developing outlying sections. Already mining companies and oil operators, who have constructed roads between their properties and railroads, are gradually replacing ox teams with trucks.

Selden and Atlas Truck Companies Enter Into Big Combine

Other Units to Be Acquired State Promoters of Industrial Motors Corporation, Recently Incorporated Under Laws of State of Delaware.

DOVER, DEL., June 14.—Action of far-reaching significance in the motor truck industry is involved in the formation of the Industrial Motors Corporation under the laws of the State of Delaware, announced this week.

The new corporation is a holding company with an authorized capital of 1,000,000 shares of no par value, all of one class.

The announced purpose of the corporation is to acquire and hold the stocks, securities and properties of motor vehicles and accessory manufacturing and selling corporations and to manufacture and sell motor vehicles and accessories. The first two units included in the new corporation are the Selden Truck Corporation, Rochester, N. Y., and the Atlas Truck Corporation, York, Pa. Both of these companies occupy an important and commanding position in the truck industry. Their business as stated by their officers has shown steady improvement during the past few months.

It is expected by the officers of the new corporation that other important units will rapidly be acquired.

The ultimate plans include the bringing together of the strength and cooperation of some of the principal manufacturers engaged in motor truck construction, thus providing means and methods of effecting economies in the purchasing of raw materials and supplies, lowering the cost of production and greatly increasing the efficiency in manufacturing, merchandising and distribution.

The great distributing economies which the plans of the new corporation will make possible are expected to offer advantages in service to truck purchasers and to increase the dealer's opportunities for better profits through more efficient selling.

The organization of the Industrial Motors Corporation is under the direction of a committee which include John J. Watson, Jr., of New York, vice president and treasurer, International Agricultural Corporation, and president of the Lee Tire and Rubber Co.; Frederick M. Small, president of the Martin-Parry Company, York, Pa., and Indianapolis, Ind.; Reeve Schley, vice president of the Chase National Bank, New York City; George C. Gordon, president, and Robert H. Salmons, vice president of the Selden Truck Corporation, Rochester, N. Y.

RAPID RECOVERY OF FRENCH AGRICULTURE.

WASHINGTON, June 14.—Marked recovery in French agriculture is reported to the Department of Commerce by Spe-

cial Representative Dennis, who is making a field survey of the European food situation, and who is now in Berne, after a trip through France. Reports from competent observers in the so-called "red zone" quoted by Mr. Dennis, confirm the estimate that 90 per cent. of the old farm land will be in shape for cultivation during the present year. The amount of land actually cultivated may fall considerably lower, owing to the shortage of buildings and to the lack of tillage tools. Farming in the devastated regions is certainly being carried on more scientifically than before the war, the younger men particularly being more interested in improved methods.

Recuperation of the French live stock industry was furthered in 1921, despite the shortage of feedstuffs incident to the prolonged drought. Cattle are now rapidly approaching pre-war numbers, reaching 13,217,000 in 1920. Official figures for 1921 are not yet available, but the number probably has increased over the preceding year. The number of sheep in France has been declining for the past 80 years. At the outbreak of the war there were slightly more than 16,000,000 sheep in the country, but there was a decline of 9,405,000 by 1920. French hog production has for generations shown but slight variation from one year to another. The average for the 10 years preceding the war was about 7,000,000. This number was reduced to less than 4,000,000 by 1918, but has been slowly increasing, with 5,000,000 reported for 1920. Competent observers state that there was a substantial increase last year. In the absence of official figures this opinion would appear to be supported by the abundant supply of fresh domestic hog meat thrown on the market during the past winter.

The area devoted to vineyards in

OPERATORS OF BUSSES FORM ASSOCIATION.

PONTIAC, MICH., June 14.—An association of bus operators has recently been formed in this city. They have secured and established a central waiting room for the convenience of their passengers and also set a standard rate schedule.

Six bus lines are now operating out of this city to nearby cities and villages, and their owners report the continuous service of about 25 different communities. The association has also established a waiting station in the down town section which is operated the same as an interurban waiting room and station.

France has been decreasing for about 50 years. In 1874 there were 6,046,000 acres under cultivation. At the outbreak of the war only 3,831,000 acres were planted to grapes and 1920 shows a further reduction to 3,752,000 acres. The returns for 1921 are not yet available. The vineyards were but little affected by the war, but labor difficulties reduced the output in 1915 to less than half of normal. Since that year production has slowly risen and is now about normal. The industry is seriously affected by a lack of markets. Before the war wine was the most important of all French exports. Russia took enormous quantities, and Germany, although an important producing country, imported its best wines from France. Trade with England has fallen off principally because of hard times and increased taxes on champagne. With the far-reaching curtailment in the export trade, the French wine industry will likely decline, with relatively more attention given to the growing of other fruits.

CARELESS EXPORTERS PROVE PROBLEM.

WASHINGTON, June 14.—The thoughtless practise of some exporters in assigning office boys or inexperienced clerks to prepare shippers' export declarations is seriously jeopardizing the accuracy of official foreign trade figures, according to the Department of Commerce, which asks that more care be exercised in preparing these vitally important documents.

Accurate, timely trade statistics will be impossible unless shippers extend more personal cooperation in seeing that the necessary papers are properly prepared. The work should not be assigned to boys or some secondary agency having no special interest in the matter.

According to the Department of Commerce the new export classification recently adopted at the request of exporters to afford American business really useful statistical service has brought out the fact that serious errors have existed in the official figures for years, particularly in classes showing values only. Most of these errors are due to inaccurate description in the export declarations presented to customs officials by the shipper or his agent. Investigation has developed, for example, that ship and tank plates, punched and shaped, are reported as low as one cent per pound; alloyed steel bars at 1.6 cents per pound; copper wire at four cents per pound; wood and denatured alcohol at 1¼ cents per gallon; white lead at less than two cents per pound; 370 stationary electric motors of less than 200 horsepower at an average price of \$11; 183 road plows, scrapers and rollers at \$11 each; one centering lathe chuck at \$3800; grinding and sharpening machines at \$5 and \$5000, and hoes and rakes at \$132.

The department says that it realizes that the preparation of the necessary papers at times represents something of a burden and that it does not wish to appear unreasonable. It expresses the hope, however, that export shippers generally will appreciate the fact that the figures in point are being compiled.

THE MOTOR BUS FIELD

*A DEPARTMENT DEVOTED TO THE
INTERESTS OF MAKER AND USER*

MANUFACTURE — DISTRIBUTION — OPERATION — DEVELOPMENT — NEWS

Cites Various Ways in Which Bus May Aid Gotham Transportation

Existing Passenger Service Can Be Supplemented by
Motorized Equipment in Manner That Will Solve
Transit Problem Effectively Says D. L. Turner

SPECIAL BUS service to carry residents of particular neighborhoods to and from work was suggested as one of four ways in which busses might be used to help solve New York City's transit problem in a paper read recently before the National Automobile Chamber of Commerce by Daniel L. Tur-

ner, consulting engineer of the Transit Commission. The other ways enumerated were to use busses as feeders for rapid transit lines and for developing outlying sections of the city, to provide more crosstown service in Manhattan and more circumferential routes in the suburbs, and to accommodate short-haul traffic.

MR. TURNER said that only about two per cent. of New York's traffic was carried in busses compared with 35 per cent. in London. To accommodate the city's traffic of 7,500,000 passengers a day would require 47,000 double-decked busses, he said, or 80,000 single deck busses. From these figures Mr. Turner deduced that it would be impossible to use busses as the principal method of transportation, because of the congestion they would create. By the methods he suggested the bus in each case would supplement existing service, but would not be a general substitute.

"First," said Mr. Turner, "busses may be used to furnish a special route service every day for regular customers. Regular through-route special service workward in the morning and homeward at night can be furnished for segregated groups of patrons.

"It is not unreasonable to expect a single apartment building to supply sufficient business for such a route. A block of such buildings could

easily do so. Those in a position to sell such a service cannot expect their prospective customers to initiate such special routes. Our residential population is so massed, and the business centre is so concentrated that many such special route services are possible.

"It would be reasonable to expect a special rate for this kind of service. Monthly tickets could be issued. The busses on such routes would start from definite points, morning and night, at specified times. Having received its full load, the bus would run express by the shortest route to the unloading district. A patron of such a route should be permitted to use the company's regular lines for a single trip each way daily in case he should unavoidably miss the special bus.

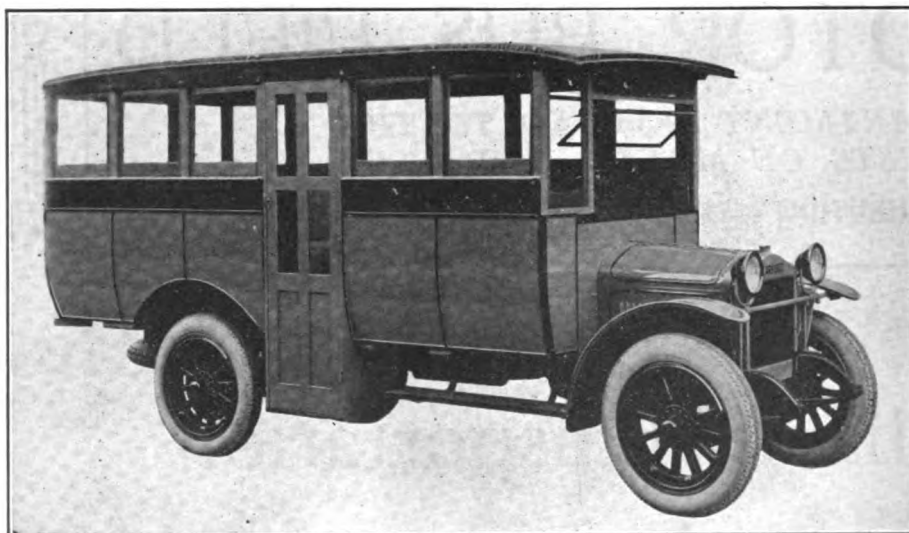
"Second, New York needs more crosstown or circumferential routes in order better to articulate the traffic carried on the workward and homeward lines. Crosstown routes are relatively short, particularly in Manhattan. Such a service, where possible without conflicting with the

prior or controlling franchise rights of the surface lines, can be furnished better by busses than in any other way. At the center, in Manhattan, there should be as many such bus lines as there are rapid transit stations to be connected together across town. A passenger, debarking at a rapid transit station in the business center, would then be served with a bus line which would carry him to any point across town where he might desire to go or to any other rapid transit line.

"At the present time there are seven rapid transit lines—subway and elevated—consisting of 23 tracks which traverse Manhattan, north and south. There is not a single crosstown rapid transit line articulating this system. This is a very great defect in our present transit system.

"The commission proposes to correct this condition by building a moving platform line across 42nd St., from river to river, to afford a convenient means of transfer between all the north and south lines. Other such lines will have to be

THE GARFORD DEPOT BUS



Comfortable and Speedy Transportation Is Furnished by This Garford Bus.

WITH A DESIRE to serve more efficiently the particular transportation needs of hotel, country club and summer resort guests, the Garford Motor Truck Company has produced a special passenger carrying unit known as Garford Type "I" bus. In its design are embodied features peculiar to this class of service that make for comfortable and speedy conveyance on short trips with an added convenience to passengers of carrying baggage or luggage within "arms reach" at all times.

THE STANDARD Garford Model 15 chassis is incorporated in this bus unit giving assurance for ample speed of thirty-five to forty miles an hour. Easy riding qualities and exceptional roadability are also found in this chassis when used for passenger carrying.

The body is designed for the comfortable seating of 11 adults. In an emergency, the wide aisle also provides standing space for carrying additional passengers.

The passenger entrance door is placed in the center of the body on the right side, which allows space forward of door and to the right of driver's seat for baggage and lug-

gage. The driver's door is placed on the left side of body.

The upholstery is of rattan with an optional choice of imitation leather. Hand rails, attached to the ceiling; four dome lights, four ventilators and bumper at rear of body, tool box under rear seat, are provided as standard equipment. New body is also constructed for installation of carrier, rear emergency door and heaters, if desired.

From railway station to hotel, from hotel or residence to country club, or from community center to summer resort, this Garford Type "I" bus will operate profitably from the standpoint of first investment, states the builder.

(Continued from Preceding Page.)

built in the future. Of course, where such facilities are provided and where surface cars are furnishing the service, busses should not duplicate the service.

"Third, busses can be used to some extent to accommodate the short-haul traffic in congested centres in place of surface car lines. This would not mean a general elim-

ination of the surface cars and a substitution of busses, but the use of busses in place of cars only when and where excessive vehicular congestion requires it. Although the rapid transit lines are rapidly taking over most of the long-haul business, and although the surface cars carry a smaller and smaller proportion of the total traffic each year, nevertheless, the surface cars still

carry nearly a billion fare passengers a year. They will continue to carry a large volume of traffic. The surface cars can not be eliminated from the transit system.

"The vehicular congestion in many of the streets of Manhattan—particularly in the important north and south thoroughfares—has nearly reached the limit. It is of paramount importance that consideration be given to the needs of vehicular traffic. To this end it is proposed to re-route the north and south surface lines in Manhattan in such a way as to remove surface car operation from four avenues and reserve such avenues for vehicular traffic, exclusively. The busses will not interfere with other vehicular movement as much as the cars do now.

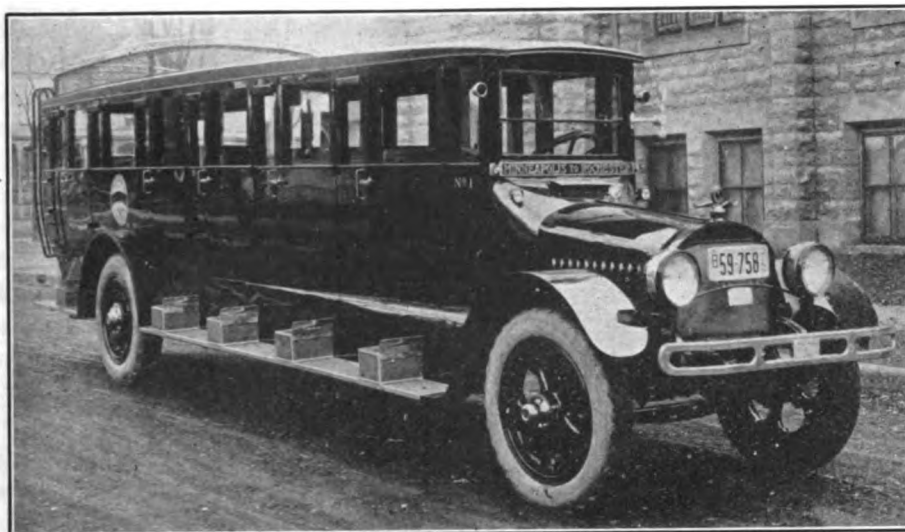
"Fourth, and the most important of all the uses mentioned, the bus should be utilized as an important auxiliary to our subway and elevated lines in developing the outlying areas of the city. The rapid transit lines should constitute the main arteries of the transit system. The areas between, in the undeveloped sections, should be served by busses shuttling between the main rapid transit lines, collecting traffic in the sparsely settled areas.

"In this way the intermediate territory would be developed to the point where it can support the large expenditure required for a rapid transit line. When the new areas have been developed and the population has increased to the point where the bus lines, the feeder lines and the rapid transit lines are not able to supply all of the transportation required, then the territory served by the bus lines can be opened up with a new rapid transit line. The new rapid transit line would thus serve the territory which had already been partially developed.

HIGHWAYS GAVE EMPLOYMENT TO MILLION.

WASHINGTON, June 14.—In 1921, 1,000,000 men labored during the road building season in making and repairing highways, according to figures recently compiled by the highway department.

Multiple
Limousine Type
Bus That Fills
Between
World-Famed
Surgical Institution
and Railroad
Station.



It Is
of the Finest
Construction and
Has Specially
Designed Features
That Makes It a
Superior Convey-
ance for Patients.

BUSSES DE LUXE TO SURGICAL MECCA

ROCHESTER, MINN., is the location of the most famous surgical institution in America, if not in the world. From all over the earth sufferers come to the Mayo brothers for surgical attention. Rochester is 90 miles from Minneapolis, and up until recently the only means of transportation has been either the local trains on the railroad or hired automobiles. To provide the privacy and ease of the

former and to eliminate the necessity of a taxicab ride at either end, J. H. Maylone has established the DeLuxe line, running from the Curtis Hotel in Minneapolis and the St. Paul Hotel in St. Paul to the Kahler and Zambrotta Hotels in Rochester. While Mayo's sanitarium is the chief attraction in Rochester, the DeLuxe line also serves those traveling between the two points for other reasons.

THE first of the busses, illustrated herewith, recently placed in service, is of the multiple limousine type, having five compartments, separated by glass partitions and provided with individual doors on each side. They are carried on large pneumatic tired Mack bus chassis, the ease of riding being enhanced by unusually long springs and Mack rubber shock insulators between the spring ends and the frame, thus eliminating the ordinary rigid spring shackles and substituting therefor blocks of live, resilient rubber.

Four of the five compartments are for passengers, the fifth being for the driver with one extra seat for a passenger. Three of the remaining compartments are exact duplicates, being provided with deeply cushioned divan seats, accommodating three passengers each. Last compartment is larger than the rest, having rotunda seating for nine, being used as a smoking compartment. Easy ingress and egress to each compartment is provided by the unusual width of the doors and by aux-

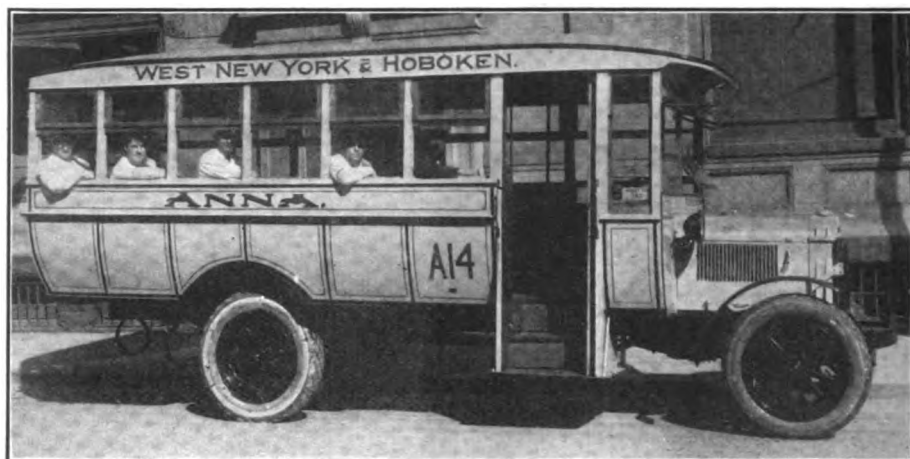
iliary steps carried by the running boards. Each compartment is equipped with an effective ventilator on each side, which can be controlled by the passengers to just the amount of fresh air desired, without affecting the ventilation of the other compartments. Similarly the heating system is individual, each compartment being provided with a register in the floor which communicates with an air jacket about the exhaust pipe. Each register can be controlled independently. Windows throughout are of heavy plate glass and can be opened by the passengers by means of same crank type of regulator as used in limousines.

The body is enameled a deep blue, with chassis painting to harmonize. All seats, except those in the smoking compartment, are upholstered in gray striped velour laid over genuine leather, the ceiling, window posts and carpet seat backs being finished in harmonious material. The smoking compartment is upholstered in gray leather. The cushions are provided with compound springs and real curled hair padding. A large

baggage rack is provided on the rear portion of the roof, having a wire mesh railing and leather covered steel straps, extending from front to back to hold the baggage down snugly. A tarpaulin cover fastens down firmly over this to protect it from dust. This upper deck is reached by a ladder at the rearmost portion of the right side. Space for hand baggage is provided under the rear seat, a locked door at the rear permitting it to be reached.

The present bus makes one round trip each day, the roads being good gravel, straight and level. The trip requires 4½ hours and is made on fixed schedule. The fare is \$5 each way, only a few cents more than the regular first class railroad fare. All seats are numbered and reserved in advance, so that the first purchasers of tickets are assured of their choice of seats and no jostling to secure the best seats takes place. An unusual feature of the service is that each ticket carries complete casualty insurance, the ticket being divided by perforations. On boarding the bus the passenger surren-

BRIDGEPORT BUS



This Well Planned Vehicle, Known as the Model A A Bus, Was Built for New Jersey Motor Co. by Bridgeport Motor Truck Corp.

ders half of the ticket to the operator and retains the other half as an insurance policy.

The chassis, while a regular Mack bus type, of 216-inch wheelbase, is specially equipped for this service. It is provided with the Mack special bus engine, four by five, producing 35 horsepower at its maximum

speed of 1450 revolutions per minute, as limited by the governor. The wheels are Dayton steel wheels, provided with demountable rims. Tires are Goodyear rutproof type, 36 by six front and 40 by eight rear. One spare of each size are carried under the floor at the rear. Hub caps are nickel plated and the radiator

enameled to match the painting. The radiator cap sports a pair of eagle's wings and a motometer and the fenders are of special close fitting type. The usual headlights are replaced with a pair of the drum type. The interior of the body is provided with limousine type flush lights throughout. In addition to the usual side lights there are two tail lights set in the body near the roof, and two green marker lights high at the side of the windshield. The latter are designed to distinguish the bus at night. At the left side of the driver is a signaling device consisting of a nickel plated arm carrying a red arrow head at its end. This arrow head is illuminated at night. In addition there are two stop signals at each side at the rear, operated by the foot brake. There is a heavy double bumper at the front provided with hydraulic cushions and the cowl is equipped with a large hatch type ventilator.

Another bus of the same type is now being constructed.

BUS EXTENDS TROLLEY SERVICE

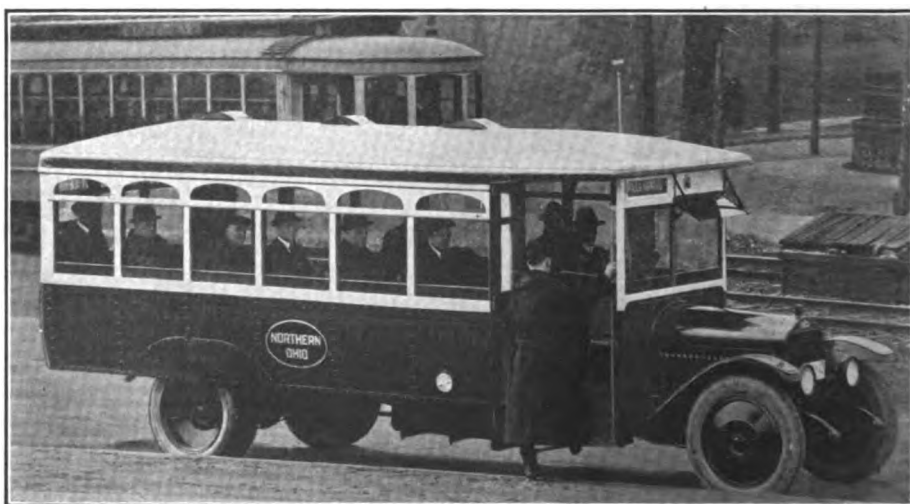
THE FACT that he may reside blocks from a car line is not causing the commuter as much inconvenience as formerly. Electric railways in their desire to better serve patrons are installing motor busses for the convenience of riders living in sections not adjacent to car lines, and many a commuter now finds it possible to step from his porch into a waiting motor bus and be whirled away to the nearest transfer point on an electric line.

ELECTRIC railways are rapidly turning to the motor bus as an economical means for extending service and better serving the public. Numerous well known traction companies have added motor bus equipment in recent months and indications are the electric lines ultimately will become large users of the gasoline carrier. Railways in a number of cities have purchased busses for the establishment of lines and initial experiments have proved so successful that many

roads, after giving the bus a thorough trial, have decided to greatly increase their bus equipment. The bus offers an excellent cross-town transportation medium, and is far less costly than equipment necessary for the operation of electric cars.

The Milwaukee Electric Railway & Light Company is a large user of busses. The company has 18 White

busses in service and nine more on order which will be put on the road within the next few weeks. Three of the company's busses are in inter-urban service between Milwaukee and Waukesha. Other electric lines having recently purchased White motor busses are the Northern Ohio Traction & Light Company, Akron, 13; and the Rockford & Interurban Railway, Rockford, Ill., 6.



White Bus Such as Is Used by the Milwaukee Electric Company.

ENGINEERS APPROVE RAIL BUS

A DIRECT comparison of the performance of gasoline rail cars, gasoline motor busses and a regular railroad train was made for the first time recently, when a party of 65 automotive engineers journeyed by all three methods from New York to New Haven and return. The party, consisting of members of the Metropolitan section of the Society of

Automotive Engineers, witnessed this unusual demonstration in attending a joint meeting with the New England section of the society at the Sheffield Scientific School of Yale University. It was made possible through the cooperation of the New York, New Haven & Hartford railroad and the International Motor Company.

THE trip from the headquarters of the society at 29 West 39th street, New York, to the Harlem river terminal of the New Haven road was made in two Mack 25-passenger motor busses, where the rail cars were waiting. The rail cars were two of the three Mack rail cars operated by the New Haven system and took the party from New York to New Haven. The trip from the Harlem river to New Haven, 67.2 miles, was made in two hours and 40 minutes, an average speed of 25 miles per hour. Simultaneously with the departure of the rail cars the two Mack busses started for New Haven by road, arriving there just 42 minutes later than the rail cars. The distance by road, as given by the Automobile Blue Book, is 70.3 miles, the time of the busses being three hours and 22 minutes, an average speed of 21 miles an hour. The return to New York was made on one of the fast electric trains of the New Haven road, the return trip being to the Grand Central terminal at 42nd street, 72.3 miles. The train schedule called for one hour and 58 minutes for this distance, an average speed of $36\frac{1}{2}$ miles an hour.

A comparison of these performances is interesting, not because the three types of transportation equipment may ever be expected to compete, since each occupies a distinct field, but because it shows the flexibility and adaptability of automotive equipment as applied to passenger transit. The train, of course, was a fast, long distance express train, consisting of mail, baggage and express cars, coaches, Pullmans and a diner, with accommodations for about 350 passengers. The rail cars were provided with seats for 35 passengers and a compartment for their

baggage. The busses seated 25 passengers. The electric locomotives are capable of pulling such a train as this as fast as 70 miles per hour. The gasoline rail cars can do 40. The busses can be operated safely at 30 miles an hour. The performance of none of the three represents its maximum capabilities, since the train

On many of these lines, even where the mileage is equal to or greater than the New York-New Haven run, there is insufficient traffic to warrant running more than one small train a day, which is generally not satisfactory service to the public. It is for lines of this character that the Mack gasoline rail car



Mack Rail Car Makes Good Showing on New York-New Haven Run.

and the rail cars were held down below their maximum speed by their schedules; the busses by speed laws on the highways.

The demonstration did show the flexibility of gasoline equipment, both on the highway and on the rails, however, a flexibility which steam and electric railway equipment both lack. On the particular route covered the density of traffic unquestionably makes the regular steam or electric train the most economical and satisfactory to the public, since frequent service can be given with well filled trains.

Branch lines, on which there is less density, cannot be economically served by steam or electric trains because of the lack of traffic volume.

has been developed and adopted by the New York, New Haven & Hartford and other railroads throughout the country. With these small, economical carriers, frequent service can be provided at a profit to the railroad where in many cases even the minimum one-a-day franchise-holding steam train schedules would occasion a loss.

The two cars supplied by the New Haven road were taken from regular branch line runs especially for this demonstration. One operates between New Haven and Derby, Conn., and between New Haven and new Hartford, Conn., making 164 miles per day. The other makes a daily round trip between Litchfield and Waterbury.

A third car makes two round trips daily over the 15-mile branch line between Tremont and Fairhaven, Mass.

In a short talk given by W. L. Bean, mechanical assistant to the president of the New York, New Haven & Hartford railroad, during the meeting at New Haven, he stated that the railroads were deeply interested in the possibilities of gasoline rail cars in turning operating losses on branch lines into profits and bespoke the cooperation of automotive engineers in assisting in the greater development of automotive railway equipment. The meeting was devoted

**LOG OF TRIP TO YALE UNIVERSITY OF METROPOLITAN SECTION
SOCIETY OF AUTOMOTIVE ENGINEERS.**

Incident	Mack Busses	Mack Rail Cars	N. Y. N. H. & H. Train
Leave Harlem River	9:15 A. M.	9:15 A. M.	.....
Arrive New Haven	12:37 P. M.	11:58 A. M.	.....
Leave New Haven .....	.....	.....	6:05 P. M.
Arrive Grand Central .....	.....	.....	8:02 P. M.
Elapsed time	3:22	2:40	1:58
*Mileage	70.3	67.2	72.3
Difference from bus time .....	.....	1:42	1:24
Difference from rail car time	1:42	.....	1:43
Average speed in miles per hour..	21	25	36½

*Road mileage from "Automobile Blue Book."
Railroad mileage from "Official Guide of the Railways."

ed to an inspection of an automobile chassis testing dynamometer in the mechanical engineering laboratory of the Sheffield school and an ad-

dress on power losses in automotive chassis by Prof. E. H. Lockwood, a prominent engineering authority connected with the school.

INTERNATIONAL SCHOOL BUSES

SIX large International busses were delivered to the high school at Modesto, Cal., recently by the Turner Hardware & Implement Company, the manufacturer's representatives in Modesto. The busses were driven in from San Francisco, where they had created great interest as they were driven down Market street to the ferry. The fleet was escorted into Modesto with great ceremony by the business men of Modesto and the school board, with a band, and all the customary trimmings.

THESE new International busses have a wheelbase of 196 inches and a length over all of 24 feet. They are equipped with 38x7 pneumatic cord truck tires and in spite of their great size handle as easily as a touring car, it is said.

The entrance to the busses is at the front in direct control of the driver. One large upholstered seat reaches across the rear, with smaller

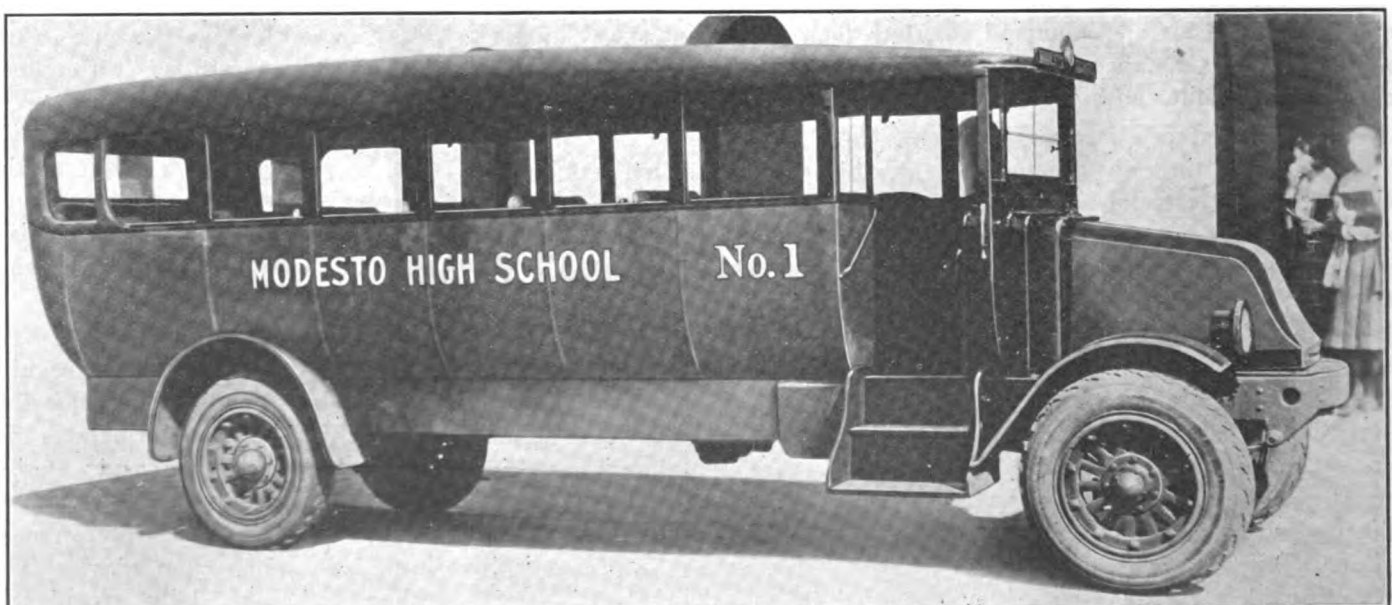
seats running crosswise. The body is constructed throughout of hard wood with aluminum bindings. Glass panels on the sides are easily adjustable to meet weather conditions.

The same size channel is used in the frame of the bus chassis as on the regular five-ton International motor trucks. It is lengthened as a solid unit, not spliced. This feature

also applies to the other parts of the chassis.

The six busses have a regular route to cover in picking up the pupils for the Modesto high school and are run on schedule time. There are stations established along the route where the pupils gather at specified times.

These International busses present a pleasing appearance in their lines and color scheme, and the city of Modesto is quite proud of its new school transportation equipment, which may be expected to prove a great advertising medium for this progressive spirit of this wide-awake little California city.



Modesto, a Small California City, Has Just Received Six of These Highly Efficient International School Buses.

Motor Vehicle Fuel Systems

A Comparative Analysis of the Various Methods Employed by Present Day Manufacturers Explaining in Detail the Construction and Proper Functioning of These Important Units.

IN ALL motor propelled vehicles it is necessary to make provision for the storing of the fuel used in the engine and a means of supplying it to the carburetor. In the modern car there are three systems in common use for adequately taking care of these necessities, known as the vacuum, the force feed and the gravity systems.

WHENEVER an open flame is used at a distance from gasoline it should always be placed at a level above the gasoline.

In storing this fuel, it is always best to place it in an underground tank or in an air-tight container located in a separate building and

er. Each piece of motor equipment should be provided with a small chemical extinguisher for this purpose.

Gravity System.

In the days of the motor car's infancy, the designers, in practically all cases, used the Gravity System

Before describing these systems a few words in regard to the handling of the motor fuel will not be amiss. Most of the modern vehicles use gasoline as the propelling agent. This being a volatile liquid, it is dangerous if handled improperly, but is quite safe if necessary precautions are taken, although too much care cannot be exercised.

vehicles. In this system the storage tank must necessarily be placed above the carburetor so that the gasoline will flow from it to the carburetor by gravity. A typical system of this kind is shown in Figure 1. Features which recommend this system to the average motorist are its simplicity and its lack of complicated parts. The storage tank has a filler cap in the top with an air vent through it. The gasoline outlet is located at the bottom and leads to a sediment well and drain plug. The feed pipe to the carburetor leads off from the top of this well and is laid as straight and short as possible. A stop cock is usually installed to shut off the supply of gasoline if necessity demands. A much better stopping device sometimes provided is a needle valve which protrudes down from the top of the tank allowing the flow of the fuel to be controlled without reaching underneath the tank. To show the amount of fuel in the tank, automatic gauges are

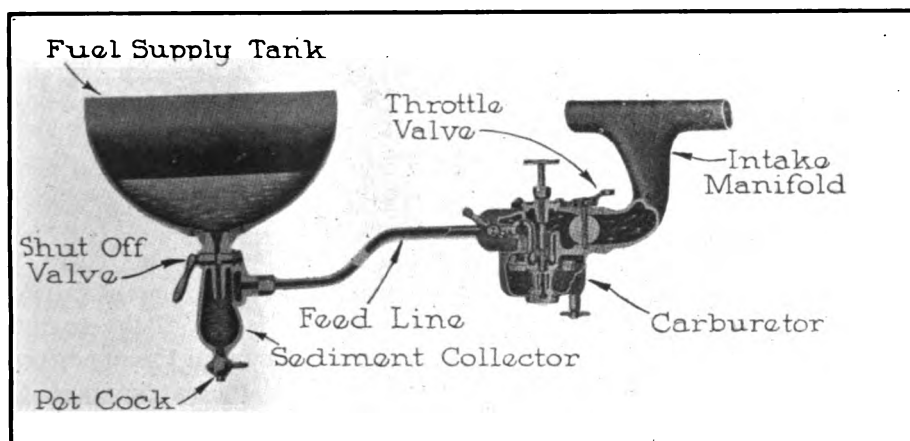
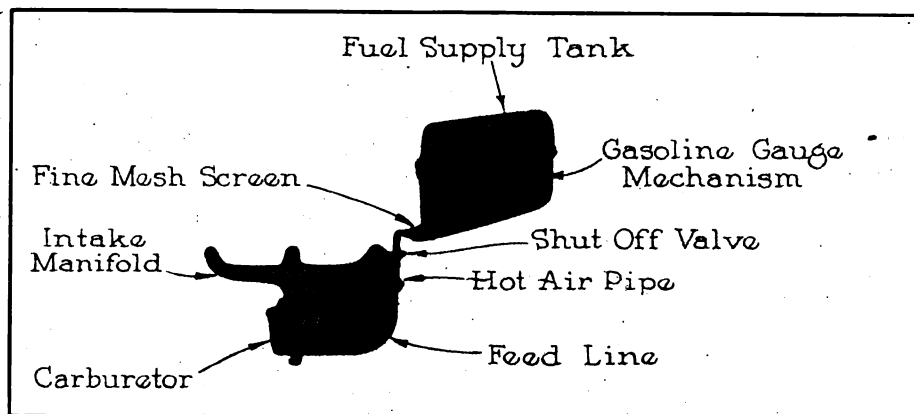


Fig. 1—Gravity Fuel Supply System Used on a Well Known and Popular Car.

used especially for that purpose. By having the gasoline covered in this manner it is removed from the direct rays of the sun which might cause the forming of an explosive gas. In case of a gasoline fire, never use water in an attempt to extinguish it as this will only tend to spread the flame. The reason for this is the difference in specific gravity of water and gasoline. The gasoline, being lighter than the water, rises to the top and the flame will continue undiminished. The only successful method of extinguishing a gasoline fire is to smother it with sand, sawdust, steam or a chemical fire extinguish-

for supplying the liquid fuel to the carburetor. This system is used quite extensively at present on both passenger cars and commercial ve-



The Supply May Be Placed at the Dash When the Gravity System Is Used.

frequently provided by the manufacturer. This enables the motorist to tell at all times the exact amount of fuel on hand.

Because of the simplicity of construction, the gravity system does

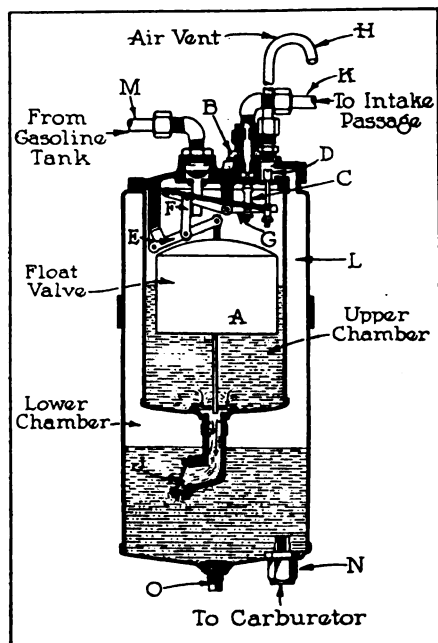


Fig. 2—Detailing the Proper Functioning of the Vacuum Fuel Supply System.

not ordinarily afford the motorist much concern. This is especially true if the motorist exercises a small amount of diligence and care to prevent foreign matter from finding its way into the fuel system. On the other hand, the system has several drawbacks, the greatest one of which is the varying pressure caused by the relative height of the tank and carburetor. Since the carburetor and tank are in fixed positions on the car, when ascending or descending grades, it necessarily follows that the pressure of the fuel on the float of the carburetor varies. This will cause a slight variation in the mixture being supplied to the engine. The pressure of the fuel is usually very low in this system as the height of the supply tank is limited by the design of the present day automobile. As a rule, it is placed in a very inaccessible position. This fact also makes it difficult to shut off the supply of gasoline in case fire occurs at the carburetor. The result may be serious if the supply of gasoline is not immediately checked.

When refilling the supply tank in

this system, it is good policy to strain the fuel through a screen of fine mesh. This will eliminate the possibility of debris or sediment gaining entrance to the supply system. Dirt, when allowed to accumulate in the system, causes a great deal of annoyance by locating beneath the needle valve and holding it off its seat, permitting flooding of the carburetor and choking of the engine.

Vacuum System.

In the Vacuum System the gasoline is forced to the carburetor by the removal of pressure at the carburetor end of the system and the atmospheric pressure acting upon the fuel in the supply tank. A small auxiliary vacuum tank is installed near the engine and the atmospheric pressure forces the fuel to this tank. It then flows by gravity to the carburetor. The piston action of the engine rarifies the pressure in the auxiliary vacuum tank whenever a new supply of gasoline is needed.

The usual vacuum gasoline tank consists of two chambers. The upper is the filling chamber and the lower is the emptying chamber. These chambers are separated by a partition in which is placed a valve. The action of the pistons, reducing the pressure in the upper chamber, causes a vacuum which closes the valve between the two chambers and causes the gasoline to be forced from the main supply tank into this upper chamber by the atmospheric pressure. As the gasoline flows into this chamber it raises a float. When this float has risen to a certain point, it operates a valve which cuts off the action of the pistons and, also, opens a valve which admits the pressure of the atmosphere to enter the chamber. This admission of the outside air releases the vacuum and causes the valve leading to the lower chamber to open. The opening of this valve allows the gasoline to flow immediately to the lower or emptying chamber. Atmospheric pressure is constant in the lower chamber and at all times forces the gasoline through its connection to the carburetor in an uninterrupted flow.

On a car having a vacuum system the tank of which has been entirely drained, it may be found necessary to prime the vacuum tank before fuel will be supplied to the carburetor. Referring to figure (2) the float (A) will be at the bottom of the upper chamber. By pouring gasoline into the tank through the filling plug (B) the float (A) is raised in the chamber which actuates the vacuum valve (C) and the atmospheric valve (D) away from its series of bell cranks (E) (F) and (G). Thus, the fuel, in raising the float (A) brings the vacuum valve (C) toward its seat and lifts the atmospheric valve (D) from its seat. When the upper chamber is approximately two-thirds full, the vacuum valve (C) is closed and the atmospheric valve (D) opens, admitting atmospheric pressure to the upper chamber through the air vent (H). The resultant pressure in the upper chamber immediately expels the fuel from this chamber to the lower chamber through the check valve (J). As the level of the fuel lowers, the float (A) descends and, through the bell cranks (E) (F) and (G), closes the atmospheric valve (D) and opens the vacuum valve (C). This action of the vacuum valve (C) allows the pistons of the engine to create a vacuum in the upper chamber through the intake pipe (K). The vacuum thus created permits the atmospheric pressure to force the gasoline from the main supply tank to the upper chamber which causes the same cycle of events as formerly described. (L) is a channel space between the inner and outer shells. This space is open to the atmosphere through the air vent (H), which allows a constant pressure of the atmosphere in the lower chamber. (M) is a direct line of pipe from the main supply tank, which may be located below the vacuum tank at the rear of the car. (N) is the direct line to the carburetor. (O) is a threaded hole into which a pet cock may be screwed with which to drain or clean the tank. This cock may also be used to draw off gasoline for priming or cleaning purposes.

Few Attentions Needed.

The vacuum system when functioning properly requires very little attention. However, some of the following troubles may possibly be experienced: The vent tube may overflow. If this happens regularly, the trouble may be a stopping up of the air hole in the main gasoline tank filler cap or the vacuum tank may not be placed high enough above the carburetor. If the vacuum system is the cause of faulty feed, one of the following defects may have occurred: The gasoline strainer may be clogged, the float may leak which will allow gasoline to be drawn into the manifold and will choke down the engine. The check valve may not seat properly, the manifold connection may be loose allowing air to be drawn into it; the tubing may have become stopped up. This system does not limit the location of the supply tank but eliminates the trouble, giving pumps and valves of the pressure system and permits the final supply of gasoline to the carburetor by gravity.

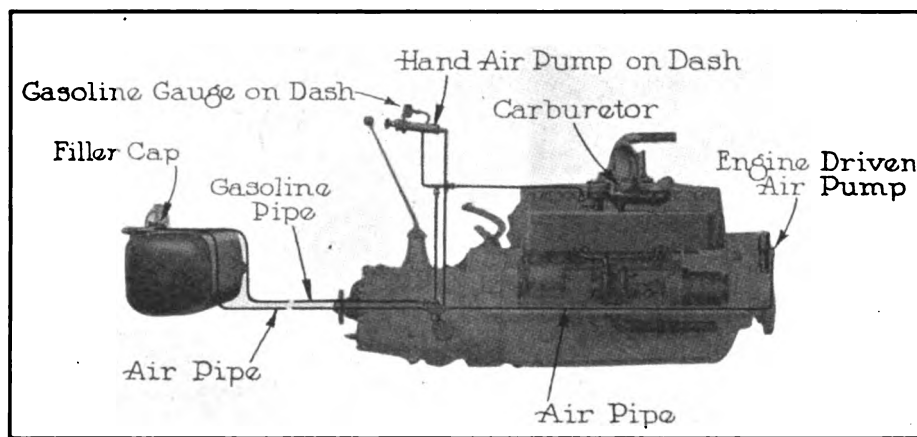
It is a fact to be deplored that many garages and service stations overhaul cars without giving this vital unit the attention it rightly deserves. Hours and days may be expended manipulating the needle valve or the air valve of the carburetor to no avail when applied to a motor the piston action of which is supplying the engine with unvaporized gasoline. In the opinion of the writer, this automobile unit should be carefully overhauled at least once each touring season.

Pressure System.

When a car is equipped with the Pressure System of feeding, the storage tank may be placed at the most accessible and convenient point on the machine. This is usually found to be at the rear of the chassis. When installed in this manner, the tank is usually lower than the carburetor which necessitates the employing of outside pressure to force the gasoline to the carburetor. This pressure is supplied and maintained by a small air pump which is automatically driven and

controlled by the revolutions of the engine. In starting, it is necessary to get enough initial pressure to force the fuel to the carburetor. This is supplied by a small auxiliary hand pump which is usually operated and located at the dash. In

short distance farther along the line, a 'Y' joint is installed, one lead going to the engine driven pump, the other leading to the pressure gauge and the auxiliary hand pump on the dash. The power pump on this system may be driven from the crank



The Pressure Supply System Makes the Location of the Tank Entirely a Matter of Choice by the Manufacturer on Whose Car It Is Used.

order to eliminate the possibility of the pressure rising beyond a safe limit, a safety valve is placed at some convenient position in the air line. A feature to be remembered in this system is the necessity for airtightness in the tank and filler cap. In order to meet the requirements of this feature, the filler cap should be carefully tightened with a wrench each time the tank is refilled in order to hold the pressure.

A gasoline gauge should be provided at the tank to ascertain at any time quantity of fuel in tank without the necessity of removing the cap. In this system, two small pipes are attached to the tank, one being the pressure line in which the medium used is air, and the other is the gasoline line. The gasoline line is joined to the tank at the lowest point and is run directly to the carburetor. The pressure line is attached at the top of the tank and is led forward to the dash. Usually, at an intermediate point between the tank and the dash, a pressure safety valve is installed. This valve is of the spring loaded type, usually being set approximately three pounds above the atmospheric pressure. This pressure blow-off valve prohibits any tendency the engine driven pump may have to build up excessive pressure in the system. At a

shaft by an integral cam thereon or from one of the valve lifters. When the latter method is employed, the lifter of the rear valve is usually utilized to supply the necessary power for operating the pump.

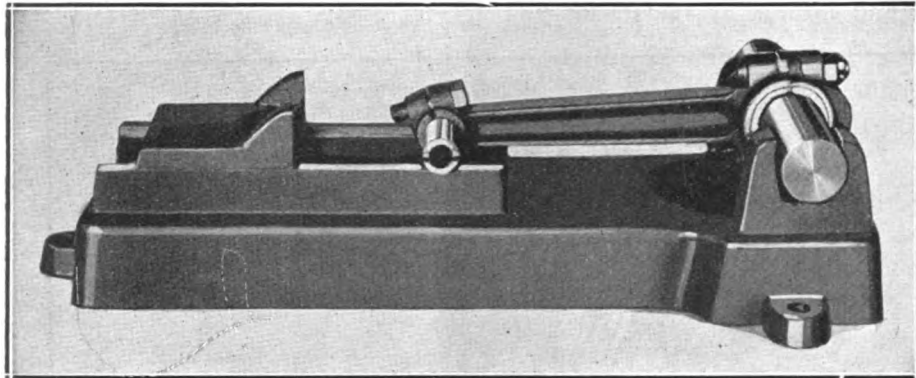
Some of the commendable features of the Pressure System are the constant pressure which is maintained in the tank at all times, causing the gasoline to be fed uniformly to the carburetor, and the fact that the location of the tank is unlimited, permitting it to be placed in the most accessible position. Should fire occur at the carburetor the supply of gasoline can immediately be shut off at the dash by turning a three-way cock at the hand pump which allows the pressure in the system to escape. By turning the cock located at the pump to one of its three positions, a passage is opened from the hand pump to the air system; by placing it in another position, the opening from the pump to the line is closed, while the third and last position opens the system to the atmosphere.

Trouble may be experienced in this system with leaks in the various pipes, valves, or filler cap. The pumps and their check valves must be overhauled at regular intervals to insure efficient operation, and eliminate any chance of derangement.

TRUCK AND BUS ACCESSORIES

Waller Connecting Rod Aligning Jig is made for all makes of cars, trucks and tractors. The sliding leaf and bed of this device are machined perfectly parallel with the mandrel, thus assuring the greatest accuracy in aligning the rod. The

crankshaft sizes except the Ford. The arbor furnished with the jig is the Ford size and the bushings slip over this arbor. With this fixture you can bend or twist the rods in the jig, it is claimed, without the necessity of taking the rods out of the

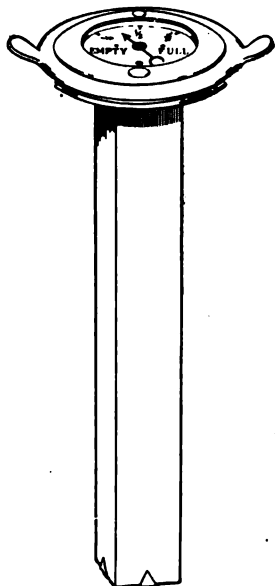


jig is so designed that the slightest twist or bend can be detected with one operation, and is so constructed that the rod may be straightened without removing from the jig.

Bushings are used for the different

Tasco Visible Gasoline Gauge is a device which eliminates the troublesome methods necessary to ascertain the amount of gasoline in the tank of a Ford car without the necessity of the measuring stick and its attendant uncertainty.

This gauge is made to fit the screw that the filler cap usually occupies, so the installation of the device is extremely simple. To equip the car with this device it is necessary to remove the original filler cap and screw the Tasco gauge in its place. This is all the effort that need be expended as the gauge immediately registers the amount of gasoline in the tank. When the motorist wishes to ascertain the amount of gas in the car, the cushion is removed and the reading of the dial taken at a glance.



Tasco gauges are made in three different types. Type A is made to be used on the old style roadster and the old style touring car. Type B is of medium length and is to be used on the new oval tank of the touring car and roadster, also the tank of the coupe. Type C is the short length and is to be used on the sedan. The list price of these gauges is \$1.00.

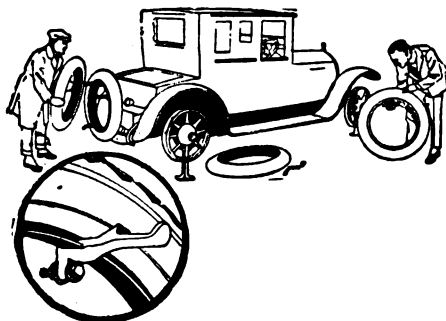
Manufactured by Akron Selle Company, Akron, O.

jig and putting them in a vise to do this work.

Detection of error is simplified whether the rod is bent sideways or twisted.

Made by Waller Manufacturing Company, Oelwein, Ia.

Erp Spare Rim Carrier is a set of three iron arms or clamps which are bolted on the original rim band of the tire rack found on the car. The arms are placed in a triangular position on the rim band so that two are at the top and the other at

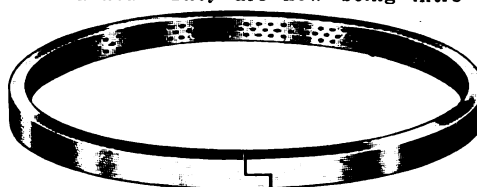


the bottom center, as shown in the illustration. The arms are so shaped that the rim of the second spare fits snugly in place so that it forms an inside grip on the second spare tire. It is impossible for the second spare to run against the first spare, thus preventing any chafing and keeping both spares in perfect condition.

No extra tools of any kind are needed to install the Erp spare rim carrier, as fingers and an ordinary monkey wrench will do the work. Both spares can be removed or attached without removing the device. This second spare tire carrier retails for \$3.50. Many motorists, who practise tire economy, find that by changing tires once in a while the tires will last longer, which can be done more easily when they carry two extras.

Manufactured by the Sedgwick Sales Company, 1405 Sedgwick Avenue, New York, N. Y.

Bear-Tite Piston Rings have been adopted as standard equipment by a number of manufacturers of the highest grade cars and used by them for the past several years with unvarying success, it is claimed. They are now being intro-



duced to the car owner. These rings are the result of careful development covering several years of exhaustive tests. The experiments, coupled with the experience gained in having cast as many as two million individually cast piston rings per month, has enabled the maker to turn out in Bear Tite Rings a product of the highest merit.

Patented Bear-Tite Rings are manufactured complete from the raw material to the finished state in the factory of the manufacturer. It is said both the



foundry and machining departments are looked upon by the trade in general as one of the most modern in the automotive industry. Special and costly machinery has been designed and built right in the plant, embodying labor saving devices and the most up-to-date methods of manufacturing their product to the closest limits of accuracy. Bear-Tite rings already have a large and increasing sale with the car manufacturer, also with the jobber and dealer, it is stated, and will, undoubtedly, be a big factor in the piston ring industry in the near future. There is an excellent policy back of the ring whose reputation is backed by 87 years of experience.

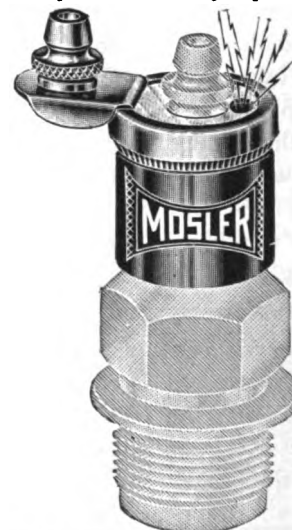
Manufactured by Foster Merriam & Company, Meriden, Conn.

Vesuvius Protector and Intensifier fits any spark plug and allows the spark to be seen.

This protector and intensifier fits right on top of the plug and the body protects the insulator, while the top acts as an intensifier.

The spark may be observed through a hole on the top. The jumps occur between the little pointer in the chamber of the device and the wall which secures it to the spark plug.

It is claimed trouble is readily detected, for if the spark does not jump at the gap



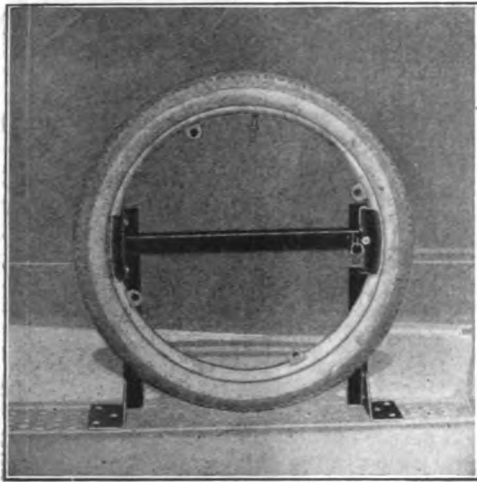
it is then necessary to verify your wiring or your source of current.

It is claimed even carbonized plugs will work with the protector. The current, while it is being built up, cannot leak over the carbon as it is held at the intensifier points until needed.

When the pressure of the current becomes strong enough to jump the intensifier gap its speed is so great and its power such that it forces its way through between the spark points though insulated with oil.

Made by A. R. Mosler & Company, New York City, N. Y.

Audet Tire Carrier Model "A" is for rear attachment. It is held with standard attaching brackets, and carries one



30x3½ or one 31x4 demountable tire. The rim is readily applied by removing the pressed steel clamp at the right with a standard lug wrench. When rim is placed on carrier, the clamp is applied and securely held with the nut. A lock can then be applied through the steel eye which protrudes through a slot in the clamp. Whether a lock is used or not, the rim is perfectly secure.

A feature of this tire carrier is its lightness of weight, still it possesses great strength. No riveting is required to attach it to the car. It is also claimed there is nothing to rattle or lose in shipment and no holes to drill in its installation, while it affords absolute security and will accommodate any type of 30x 3½ demountable rim.

This carrier is shipped in single lots or in crates of six or twelve, complete with bolts to attach to the frame. The shipping weight will average about eight pounds to the carrier. Single carriers can be shipped by parcel post. The Audet Carriers are all finished in a handsome black baked japan, and give a very neat appearance to the car itself. They are sold with an absolute guarantee.

The price of the Model "A", complete with attaching brackets, \$3.00; extra attaching brackets, per pair, \$1.50.

Made by the Audet Novelty Manufacturing Company, Williamsport, Pa.

Pratt Four Wheel Jack has two wheels installed at each end. This affords practically unlimited stability to the jack when in the operation of lifting a car. It also allows the jack to be more easily handled and eliminates the possibility of a sudden jar causing an accident.

This jack is operated by an extension lever which transmits the power exerted upon it to a pawl and ratchet, which delivers the power through bevel gears to

perfect running fit. The jacking screws are operated by bevel gears, the holes of which are threaded to receive them.

The manufacturer lays great stress upon the lack of complicated parts in his product and claims they are so compact that they occupy very little room when not in use, and the simplicity of design allows anyone to operate them.

Manufactured by William E. Pratt Manufacturing Company, Chicago, Ill.



Twin Fire Spark Plugs are said to create two distinct, double intense sparks at the proper moment. The additional flame is also said to insure snappy, powerful explosion of low-test gasoline and easier starting.

When using these plugs the electric current enters the plug through the center electrode, arcs across the first gap to the intermediate electrode, which is insulated on the lower tip of the porcelain, then to complete the circuit, arcs across the second gap to the ground electrode.

It is claimed should a flake of carbon or drop of oil "short" either gap, the spark at the other gap would continue to ignite the gas, and the hot explosions would soon burn the oil or carbon from the clogged gap. Ordinarily, both sparks occur simultaneously.

The electrodes of this plug are made from a manganese nickel alloy for the purpose the material found by extensive tests to be best suited.

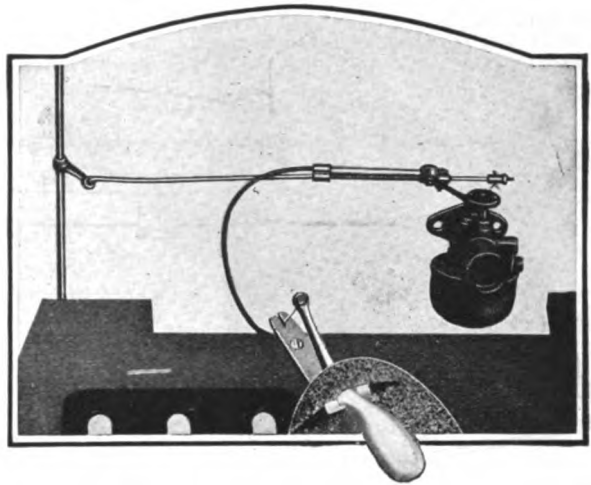
Another feature is that the plugs can be easily taken apart for cleaning should that become necessary.

The maker guarantees the plugs against defects in material or workmanship.

Manufactured by Twin Fire Spark Plug Company, Detroit, Mich.

Williams' Foot Accelerator gives a Ford the same driving conveniences enjoyed on

can rust or tarnish. The aluminum pedal adds materially to the appearance of the car.



The accelerators are packed in a box 12 and 36 in a case; and weigh in case lots less than one pound each, packed for shipment.

The Williams Brothers guarantee to replace any part made worthless through wear or defect in materials that may develop in six months of the hardest usage that the Williams Foot Accelerator may receive.

Manufactured by the Williams Brothers Aircraft Corporation, San Francisco, Cal.

Weber Crank Pin Re-Turning Tool is a simple, yet accurate and fast working device intended primarily for the trueing up of pins on all automobile and truck crankshafts.

Without altering this tool in any way an electric cutter-grinding equipment driven by a Westinghouse Electric 1/12 horsepower, 10,000 revolutions per minute motor can be conveniently attached and the cutter of the tool is ground in from two to five minutes. The end thrust of the motor shaft is adjusted by the same collet which holds the wheel. The cutter to be ground is passed in the groove of the guide blade with the fingers and micrometer adjustments are made by the hand wheel and dial of the tool. The simplicity of the adjusting features make the equipment especially attractive.

The tool itself when in operation rides around with the crank pin. The handle, however, rests at all times on the bed of the lathe. The cutting tool is fed into the pin by means of a hand wheel at the end of the tool.

The wheel has a dial below it that is graduated into one-thousandths of an inch. This dial can be locked, by means of a set screw, in any position, thus making it easy to turn all the pins to exactly the same size. The cutter is securely clamped in a V slot. It is parallel to the back plate at all times, thus generating a

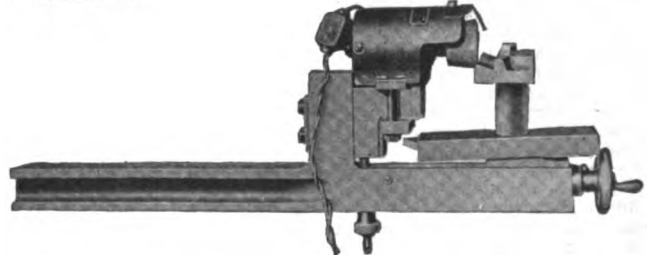


the vertical screws. Ball bearings are installed to eliminate to the greatest extent possible the loss of effort caused by friction. Shafts are made of a good grade malleable iron and machined to a

larger cars, it is claimed.

The manufacturer states the accelerator is constructed of the best grades of aluminum, brass and steel spring wire. Built like a spring, vibration does not affect it.

The parts cannot work loose. Nothing



true circle. On the V blade there are graduations which are used in setting the block for different diameter pins.

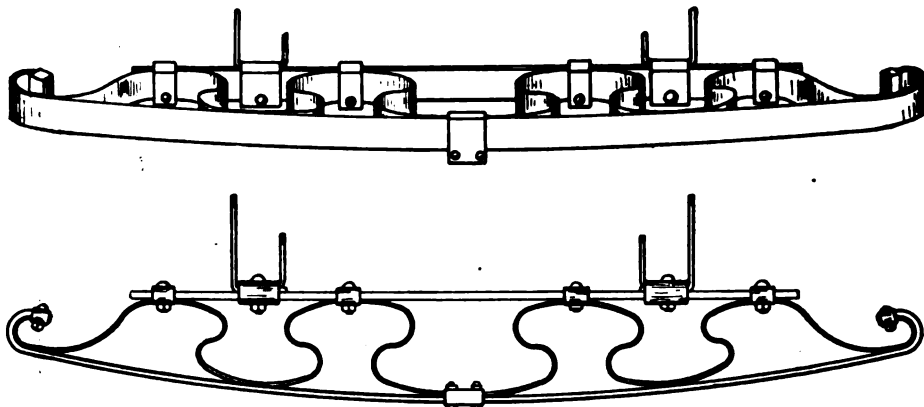
Manufactured by Westinghouse Electric and Manufacturing Company, East Pittsburgh, Pa.

(When Writing to Advertisers, Please Mention the MOTOR TRUCK.)

Protection Automobile Bumper is a new product. The design of bumper has a large amount of cushion area and the centrally located 'Hy-Lo' spring is placed in a floating position which allows it to equalize the impact at all times. This equalization condition is made possible by the spring member being anchored at the two extreme ends only and the mid-

by vibrations, it is stated.

By the use of the radius at the front of the bumper, this design will deflect a large portion of the impact while working in combination with the inner 'Hy-Lo' spring member. It is also stated that there is little or no chance of this bumper caving in at the middle section under a severe collision.



die portion being held in position by a clamp which will slip to the required position when the bumper is under impact. The centrally located 'Hy-Lo' spring only comes in contact with the outer spring member at three points which are held in position by steel bands while the other portion of the spring clears the contact by an air gap $\frac{3}{4}$ inches wide. This gap overcomes all metal chatter caused

The back spring steel portion of the bumper is anchored at the ends of the frame in a close coupled manner which overcomes a large per cent. of overhang, and, at the same time, this portion of the bumper protects the horns of the frame from being broken off under a heavy impact.

Manufactured by Protection Automobile Bumper Company, Grand Rapids, Mich.

Stay-hot Soldering Iron and Blow Torch is a new and very useful tool. It can be used to good advantage by garages, plumbers, electricians, repair shops, battery service stations and tinsmiths. It also can be used in the home, and the automobile owner will find it practically indispensable for it is, in reality, a handy tool for a handy man.



This torch, which burns denatured alcohol, does away with the necessity of carrying bulky fire-pots for the heating of irons. When in use as a soldering iron an even heat is maintained without interruption of changing irons and enables the performance of much more work in a given time with a cleaner, better grade of workmanship, it is claimed. Due to the fact that the rich blue flame only touches the back of the soldering tip, tinning lasts much longer than on the old type irons. By simply unscrewing the copper tip, the tool becomes a very efficient blow-torch, it is stated.

This appliance is made in two sizes and practically every branch of soldering work can be handled with it. It is claimed the model "A" will burn and maintain a uniform heat for thirty minutes on one filling at a cost of one cent.

and the model "B" will burn for over one hour at a cost of two cents.

These tools are made up in brass with stained wood handles and present a very attractive appearance. By removing the wood cap at large end of handle, a brass cap is exposed which is removed for filling purposes. When the wood cap is again in place a small amount of alcohol is placed in the priming cup above the wood handle for starting, which takes approximately two minutes to burn out and then the iron is ready for use.

Manufactured by Thermo Gas Products Company, 546 Atlantic Avenue, Brooklyn, N. Y.

M&K Water Pump is a device to keep the Ford motor at a constant temperature when operating. It is said to eliminate the possibility of overheating, steaming, boiling, freezing and the annoyances that inevitably follow these evils, which, in a great many instances, can be traced to improper functioning of the cooling system.



When an M&K water pump has been installed on the Ford engine, it is said to insure a positive and perfect circulation in the engine at all times and under all conditions of running. The impeller used in this device is so constructed that it furnishes a smooth, steady flow through the arteries of the engine and keeps the system clean and in perfect working condition.

This pump is said to provide a smoother running Ford engine in all weather by the maintaining of a constant working temperature and the preventing of pre-ignition.

(When Writing to Advertisers, Please Mention the MOTOR TRUCK.)

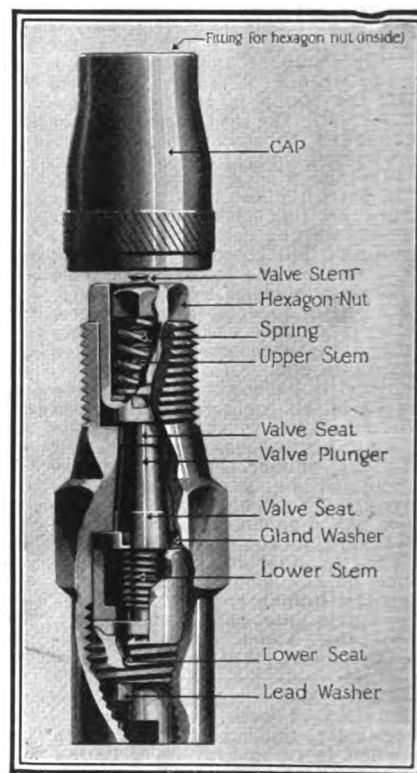
The manufacturer states that the device is easily installed in 15 minutes and does not require any extra parts. In order to install it is but necessary to remove the pipe with elbow between the radiator and motor, then install the pump in place of the pipe. Lower the fan arm as far as possible and place the new belt furnished with the pump over the pulleys. Take up the slack in the belt by readjusting the fan arm, ascertaining that the pulleys are in line. The pump is then ready to operate.

Manufactured by McDonald-Kiehl Company, 1604 Main Street, Buffalo, N. Y.

Trex Air Valve Lock has been invented to prevent tire valve leakage and end inflation troubles, it is stated.

This new lock replaces the ordinary rubber-seated air valve in the automobile tire and is attached by taking out the valve inside and screwing the new lock on to the valve stem securely. It is all metal and locks the air passage.

It is said with this valve lock there are no duties for the motorist to perform, and yet, through the constant pressure, it eliminates the cause of rim-cutting and



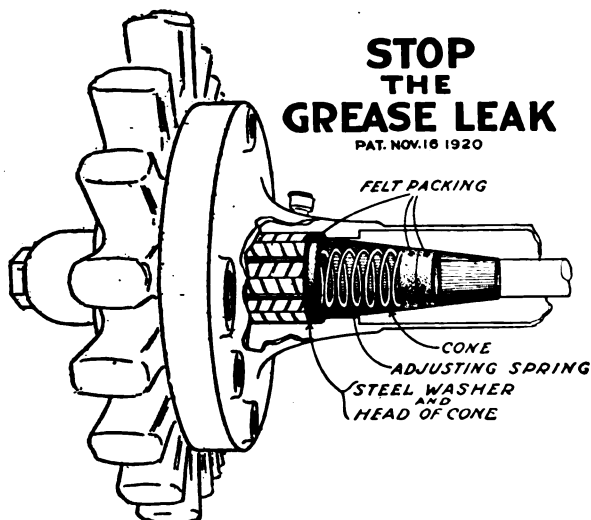
premature blowouts, and this adds to the life of the tire.

The manufacturer states the lock has no rubber parts to rot or deteriorate. It is all metal and designed to double-lock the air passage. It is said to be made with all the mechanical precision of a time-fuse and should outlast the life of the car itself. It is also claimed Trex Air Valve Lock reduces tire bills, saves valuable time and the nuisance of re-pumping. It fits any time and can be transferred from one tire to another, the same as a dust cap.

The Trex Lock is being marketed through established jobbers and dealers. Several national mediums and trade papers are being used as well as billboards, counter displays and other types of dealer helps.

Displayed in orange and black boxes, each containing five locks suitable for the four tires and spare tire on one motor car. Sold singly if you desire—only \$1.00 for each tire. Backed by a guarantee.

Manufactured by the Trexler Company, Philadelphia, Pa.



R. & R. Automatic Grease Retainers are made for Ford and Chevrolet cars.

They prevent the grease leaking through the housing into the brakes and onto the tires, it is claimed.

These grease retainers put no wear on the axle and have only one wearing part, which is the smaller pair of felt washers that are held tight at all times by a retaining spring. This spring also automatically takes up the wear. The spiral spring presses against the steel washer and the small felt washers inside the cone. This keeps an even tension on all felt washers, preventing any leakage of grease outside or inside the cone.

It is stated the retainer can be installed by the owner himself in a few moments, as it requires no special tools or mechanical skill.

You simply remove the wheel and roller bearing. (It is not necessary to pull roller bearing bushing.) Insert the R. & R. Automatic Grease Retainer, replace roller bearing, original Ford cap, felt and wheel and the job is done.

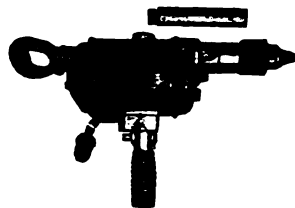
A set of R. & R. Automatic Grease Retainers comprises two complete retainers and are interchangeable. A set retails at \$2.50 and can be carried home in a man's pocket, it is stated.

Manufactured by the Macorvey Company, Wabash Building, Pittsburgh, Pa.

Garage Special Drill is a new light weight, ball bearing, portable electric drill designed for the particular use of garages and auto repair shops.

The new drill has a capacity of $\frac{1}{4}$ inch in steel. It weighs only 14 pounds and carries a universal motor for use on either direct or alternating current.

The drill is equipped with a Jacobs



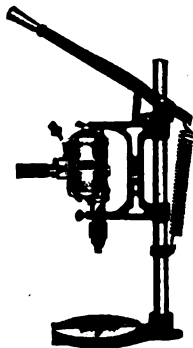
Chuck, an extra detachable side handle and 10 feet of cable with Hubbell attachment plug. A mandrel with $3" \times \frac{1}{4}"$ grinding wheel to insert in the chuck for light grinding, is furnished as an extra.

The entire motor frame, switch handle and end handle are made of aluminum. The motor windings are fully enclosed, dirt and dustproof and all working parts are protected. The motor is air-cooled by means of a fan mounted on the armature shaft.

High grade annular ball bearings support both ends of the armature shaft. A ball thrust bearing is provided for all end thrust. The chuck spindle is carried

by a phosphor bronze bearing of ample size to withstand irregular drilling pressure.

The switch is of special patented design of the quick make-and-break type with 50% overload allowance, it is claimed. It is enclosed in the handle



of the drill and is operated by means of a push button through the handle.

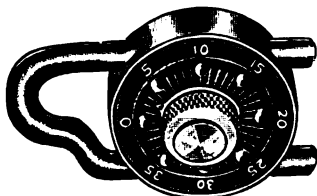
Gears are manufactured of a special analysis steel, heat-treated and hardened, being carefully enclosed and operating in grease.

The selling price of this drill is \$65.00 to the user.

Manufactured by Cincinnati Electrical Tool Company, Cincinnati, O.

Steel Spare Tire Lock is a specimen of mechanical skill. It is claimed to be absolutely fool proof and trouble proof, operating smoothly, conveniently and quickly. As this type of lock works on the principle of the combination safe lock there is no need of removing one's gloves to operate it.

The lock is sturdily built of a good quality brass, thus making it rust proof throughout its entire construction. Each lock is fully guaranteed and it is stated

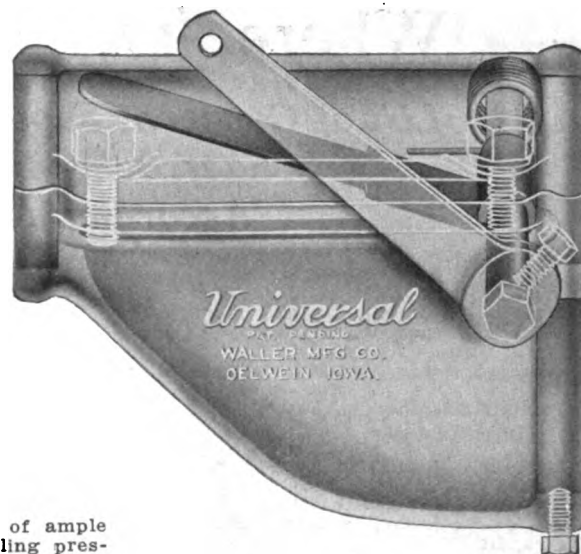


any one of them will stand a crow-bar pressure of 850 pounds.

The fact that the lock dispenses with the need of keys which ordinarily might be lost, is decidedly advantageous. No two of the combinations are alike and each setting of the lock affords an entirely different reading, making it a lock for every purpose.

Complete particulars will be furnished by the Triple Metals Corporation, Department H 5, Waukegan, Ill.

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Waller Universal Heater Cut-Out is designed along practical lines for use on all cars. The heater attachment makes it ideal for the open as well as the closed car. It is said a heater attached to this make of cut-out really heats, as the entire exhaust can be thrown through the heater. All that is necessary to attach a heater to the cut-out is to slip a piece of flexible tubing into the opening of the cut-out and fasten it with the set screw.

This appliance is made in two pieces and is easily installed, as it is not necessary to cut any pipe in two, thus weakening the pipe.

The flap of the cut-out is made of heavy steel and is machined to a perfect fit. The flap is set in inclined position and is niched so as to fit snugly on the inside of the exhaust pipe. When this flap is opened it completely shuts off the line to muffler.

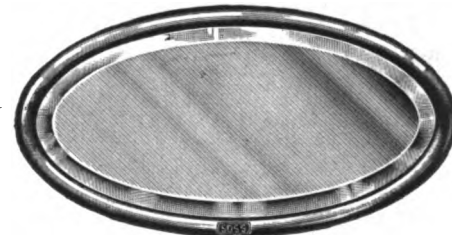
The entire cut-out is made of high grade cast iron and the lever for opening it is of malleable iron.

Manufactured by Waller Manufacturing Company, Oelwein, Ia.

Soss Grip-Tite Curtain Lights consist of a two-piece aluminum die cast frame, the halves of which are fitted perfectly together.

The special nickel plated oval head screws which hold the two halves of the frame together are pointed, and pierce the fabric very easily when the light is being installed.

The special Grip-Tite feature consists of points on the inside of each half of the frame which dovetail into recesses in



the other half. This insures a positive grip on the curtain and prevents the cloth wrinkling, sagging or pulling out.

The manufacturer claims that the sections are accurate in every detail and will line up properly when installed.

The frames of these lights are made from special nickel aluminum rust proof alloy, and are ground and highly polished it is stated.

A rubber gasket is fastened around the edges of the clear crystal glass, which prevents the glass from cracking when the screws are tightened. This rubber gasket also makes the Soss Grip-Tite curtain light, water proof and rattle proof.

Manufactured by the Soss Manufacturing Company, Brooklyn, N. Y.

Where "Orphans" May Be Equipped

List of Concerns Supplying Parts for Cars and Trucks No Longer Being Built—Arranged Alphabetically According to Trade Names of Vehicles.

- ABBOTT.**
Puritan Machine Co., 422 Lafayette Boulevard, Detroit, Mich.
Saunders, Ernest W., 27 Stanhope St., Boston, Mass.
Standard Motor Parts Co., Detroit, Mich.
- ACME.**
Puritan Machine Co., Detroit, Mich., and New York City.
- ADAMS.**
Longaker Co., V. A., 448-50 N. Capitol Ave., Indianapolis, Ind.
- AEROCAR.**
Akeley-Steele Co., 79 Galena Blvd., Aurora, Ill.
Auto Gear Co., 844 8th Ave., N. Y. City.
Auto Gear & Parts Co., 291-93 Marietta St., Atlanta.
- ALCO.**
Chandler, Ralph, J., 526 S. Flower St., Los Angeles, Cal.
Puritan Machine Co., 422 Lafayette Boulevard, Detroit.
- ALDEN-SAMPSON.**
Puritan Machine Co., 422 Lafayette Boulevard, Detroit.
Standard Motor Parts Co., New Castle, Ind.
- ALLIS-CHALMERS.**
Puritan Machine Co., 422 Lafayette Boulevard, Detroit.
- ALMA.**
Dayton Auto Parts Co., 1777 Broadway, New York.
- ALPENA.**
Gorey & Co., Jos. C., 354 W. 50th St., N. Y. City.
Puritan Machine Co., 422 Lafayette Boulevard, Detroit.
- ALTER.**
American Motors Parts Co., 430 N. Capitol Ave., Indianapolis.
Puritan Machine Co., 422 Lafayette Boulevard, Detroit.
- AMERICAN.**
American Motors Parts Co., 430 N. Capitol Ave., Indianapolis.
Auto Gear Co., 844 8th Ave., N. Y. City.
Auto Parts & Gear Co., Atlanta, Ga.
Longaker Co., V., 448-50 N. Capitol Ave., Indianapolis.
Maxwell Bros. Auto Salvage Co., St. Louis, Mo.
Puritan Machine Co., Detroit, Mich., and N. Y. City.
- AMERICAN MORS.**
St. Louis Car Co., 8000 N. Broadway, St. Louis.
- AMERICAN TRUCK.**
Pacific Motor Car Exchange Co., 221 W. 53rd St., N. Y. City.
- AMES.**
Auto Gear Co., 844 8th Ave., N. Y. City.
Auto Gear & Parts Co., 291-93 Marietta St., Atlanta.
- AMPLEX.**
Gorey & Co., Jos. C., 354 W. 50th St., N. Y. City.
Maxwell Bros. Auto Salvage Co., St. Louis, Mo.
Pacific Motor Car Exchange Co., 221 W. 53rd St., N. Y. City.
Puritan Machine Co., Detroit, Mich., and N. Y. City.
- ANCHOR.**
Anchor Motor Car Co., St. Louis, Mo.
- ANHUT.**
Puritan Machine Co., 422 Lafayette Boulevard, Detroit.
- ARBENZ.**
Auto Gear & Parts Co., 291-93 Marietta St., Atlanta.
- ARDSLEY.**
Ardsley Motor Car Co., Yonkers, N. Y.
- ARGO.**
Auto Gear & Parts Co., Atlanta, Ga.
Great Western Auto Co., Kalamazoo, Mich.
Maxwell Bros. Auto Salvage Co., St. Louis, Mo.
Puritan Machine Co., 422 Lafayette Boulevard, Detroit.
- ARGO ELECTRIC.**
Puritan Machine Co., 422 Lafayette Boulevard, Detroit.
- ATLANTIC.**
Puritan Machine Co., 422 Lafayette Boulevard, Detroit.
- ATLAS.**
Auto Gear Co., 844 8th Ave., N. Y. City.
Auto Gear & Parts Co., 291-93 Marietta St., Atlanta.
Automobile Sales Co., Springfield, Mass.
Gorey & Co., Jos. C., 354 W. 50th St., N. Y. City.
Maxwell Bros. Auto Salvage Co., St. Louis, Mo.
Puritan Machine Co., 422 Lafayette Boulevard, Detroit.
- AUSTIN.**
Puritan Machine Co., 422 Lafayette Boulevard, Detroit.
- AUTOCAR.**
Autocar Co., Ardmore, Pa.
- AUTOCRAT.**
Maxwell Bros. Auto Salvage Co., St. Louis, Mo.
- AVERY.**
Auto Parts Co., St. Louis, Mo.
- BABCOCK.**
Babcock Manufacturers' Supply Co., Waretown, N. Y.
Gorey & Co., Jos. C., 354 W. 50th St., N. Y. City.
Puritan Machine Co., Detroit, Mich., and N. Y. City.
- BADGER.**
Auto Gear Co., 844 8th Ave., N. Y. City.
Auto Gear & Parts Co., 291-93 Marietta St., Atlanta.
Puritan Machine Co., 422 Lafayette Boulevard, Detroit.
Schultz & Harder, Columbus, Wis.
- BARNES.**
Puritan Machine Co., 422 Lafayette Boulevard, Detroit.
- BAUER.**
Bauer Machine Co., 109 W. 18th St., Kansas City.
- BEAVER.**
Auto Parts Co., 4116 Olive St., St. Louis.
- BENHAM.**
Gorey & Co., Jos. C., 354 W. 50th St., N. Y. City.
Puritan Machine Co., 422 Lafayette Boulevard, Detroit.
- BENZ.**
Gorey & Co., Jos. C., 354 W. 50th St., N. Y. City.
- BERGDOLL.**
Auto Gear Co., 844 8th Ave., N. Y. City.
Auto Gear & Parts Co., 291-93 Marietta St., Atlanta.
Auto Parts Co., 4116 Olive St., St. Louis.
Bergdoll Co., Louis J., Philadelphia, Pa.
Gorey & Co., Jos. C., 354 W. 50th St., N. Y. City.
Levene Motor Co., 2200-18 Diamond St., Philadelphia.
Maxwell Bros. Auto Salvage Co., St. Louis, Mo.
- BERKSHIRE.**
Auto Gear Co., 844 8th Ave., N. Y. City.
Auto Gear & Parts Co., 291-93 Marietta St., Atlanta.
Puritan Machine Co., 422 Lafayette Boulevard, Detroit.
- BERLIET.**
Puritan Machine Co., Detroit, Mich., and N. Y. City.
- BESSEMER.**
Cutting Co., Robt. M., Chicago, Ill.
Puritan Machine Co., 422 Lafayette Boulevard, Detroit.
- BIMEL.**
American Motor Parts Co., 430 N. Capitol Ave., Indianapolis.
Puritan Machine Co., Detroit, Mich., and N. Y. City.
- BLACK CROW.**
Crow-Elkhart Motor Co., 1100 N. Main St., Elkhart, Ind.
- BLOMSTROM.**
Puritan Machine Co., 422 Lafayette Boulevard, Detroit.
- BORLAND.**
Puritan Machine Co., 422 Lafayette Boulevard, Detroit.
- BOURNE-MAGNETIC.**
Atlantic Refining Co., Philadelphia, Pa.
- BRIGGS-DETROITER.**
Levene Motor Co., 2200-18 Diamond St., Philadelphia.
Puritan Machine Co., 422 Lafayette Boulevard, Detroit.
- BRINTELL.**
Puritan Machine Co., Detroit, Mich., and N. Y. City.
- BROC ELECTRIC.**
Puritan Machine Co., 422 Lafayette Boulevard, Detroit.
- BRODESSER.**
Puritan Machine Co., 422 Lafayette Boulevard, Detroit.
- BROWN.**
Great Western Automobile Co., Kalamazoo.
- BROWNIECAR.**
Hinsdale Electric Supply Co., Hinsdale, Mich.
- BRUSH.**
Barney's Auto Parts Co., 233 W. 50th St., N. Y. City.
Gorey & Co., Jos. C., 354 W. 50th St., N. Y. City.
Puritan Machine Co., 422 Lafayette Boulevard, Detroit.
Southern Welding Co., Waco, Tex.
Standard Motor Parts Co., New Castle, Ind.
- BUFFALO ELECTRIC.**
Puritan Machine Co., Detroit, Mich., and N. Y. City.
- BURCH.**
Nebraska Iron & Metal Co., 122 Norfolk Ave., Norfolk, Neb.
- BURG.**
Wichita Auto Wrecking Co., 807 W. Douglas Ave., Wichita.
- BUSH.**
Victor Motor Co., York, Pa.
- CALIFORNIA.**
Puritan Machine Co., 422 Lafayette Boulevard, Detroit.
- CAMERON.**
Cameron Motors Corp., 2 Columbus Circle, N. Y. City.
- CARHARTT.**
Auto Gear Co., 844 8th Ave., N. Y. City.
Auto Gear & Parts Co., 291-93 Marietta St., Atlanta.
Gorey & Co., Jos. C., 354 W. 50th St., N. Y. City.
Puritan Machine Co., 422 Lafayette Boulevard, Detroit.
- CAR-NATION.**
Auto Gear Co., 844 8th Ave., N. Y. City.
Auto Gear & Parts Co., 291-93 Marietta St., Atlanta.
Puritan Machine Co., 422 Lafayette Boulevard, Detroit.
Standard Motor Parts Co., Detroit.
- CARTERCAR.**
Auto Parts Co., St. Louis, Mo.
Puritan Machine Co., 422 Lafayette Boulevard, Detroit.
Southern Welding Co., Waco, Tex.
- CARTHAGE.**
Puritan Machine Co., 422 Lafayette Boulevard, Detroit.
- CAVAC.**
Puritan Machine Co., 422 Lafayette Boulevard, Detroit.
- CENTURY.**
Puritan Machine Co., 422 Lafayette Boulevard, Detroit.
- CHADWICK.**
Chadwick Engineering Works, Pottstown, Pa.
- CHASE.**
Auto Parts Co., 4116-18 Olive St., St. Louis.
- CINCO.**
Puritan Machine Co., 422 Lafayette Boulevard, Detroit.

CINO.
Puritan Machine Co., Detroit, Mich., and N. Y. City.
Queen City Auto Parts Co., 633 Main St., Cincinnati.

CLARK.
Clark Motor Car Co., Shelbyville, Ind.
Puritan Machine Co., 422 Lafayette Boulevard, Detroit.

CLARK-CARTER.
Cutting Co., Robt. M., Chicago, Ill.
Erbes, L. C., 2654 W. University Ave., St. Paul.
Puritan Machine Co., 422 Lafayette Boulevard, Detroit.

CLEVELAND.
Garford Motor Truck Co., Lima, O.
Pacific Motor Car Exchange, 221 W. 53rd St., N. Y. City.

COATES-GOSHEN.
Coates-Goshen Auto Co., Goshen, N. Y.
Gorey & Co., Jos. C., 354 W. 50th St., N. Y. City.
Miller Car Co., Goshen, N. Y.

COLBURN.
Colburn Automobile Co., 416 E. 10th Avenue, Denver.
Puritan Machine Co., 422 Lafayette Boulevard, Detroit.

COLBY.
Puritan Machine Co., 422 Lafayette Boulevard, Detroit.

COLUMBIA (Old).
Columbia Auto Repair Co., 19 Buckingham St., Hartford.
Puritan Machine Co., Detroit, Mich., and N. Y. City.

COLUMBIA KNIGHT.
Columbia Auto Repair Co., Hartford.
Standard Motor Parts Co., New Castle, Ind.

COLUMBUS.
Genesee Auto Wrecking Co., 430 Genesee St., Buffalo, N. Y.

COLUMBUS ELECTRIC.
New Columbus Buggy Co., Columbus, O.

COLUMBUS GASOLINE.
Columbus Buggy Parts Co., Columbus, O.

CONNEERSVILLE.
Puritan Machine Co., Detroit, Mich., and N. Y. City.

CONTINENTAL.
Puritan Machine Co., 422 Lafayette Boulevard, Detroit.
Wyckoff Auto Salvage Co., Sioux City, Ia.

CORBIN.
Corbin Motor Vehicle Co., New Britain, Conn.

CORBITT.
Puritan Machine Co., Detroit, Mich., and N. Y. City.

CORREJA.
Auto Gear Co., 844 8th Ave., N. Y. City.
Auto Gear & Parts Co., Atlanta, Ga.
Gorey & Co., Jos. C., 354 W. 50th St., N. Y. City.
Pacific Motor Car Exchange Co., 221 W. 53rd St., N. Y. City.
Saunders, Ernest W., 27 Stanhope St., Boston, Mass.

COURIER.
Akeley-Steele Co., 70 Galena Blvd., Aurora, Ill.
Auto Gear Co., 844 8th Ave., N. Y. City.
Auto Gear & Parts Co., 291-93 Marietta St., Atlanta.
Genesee Auto Wrecking Co., 430 Genesee St., Buffalo, N. Y.
Puritan Machine Co., 422 Lafayette Boulevard, Detroit.
Saunders, Ernest W., 27 Stanhope St., Boston, Mass.
Southern Welding Co., Waco, Tex.
Standard Motor Parts Co., Detroit, Mich.
Wyckoff Auto Salvage Co., Sioux City, Ia.

COURIER-CLERMONT.
Puritan Machine Co., 422 Lafayette Boulevard, Detroit.

COURIER-GLIDE.
Standard Motor Parts Co., New Castle, Ind.
Maxwell Bros. Auto Salvage Co., St. Louis, Mo.

CRAIG-TOLEDO.
Colter, A. W., Toledo, O.
Puritan Machine Co., Detroit, Mich., and N. Y. City.

CRESCENT.
Auto Gear Co., 844 8th Ave., N. Y. City.
Auto Gear & Parts Co., 291-93 Marietta St., Atlanta.
Puritan Machine Co., 422 Lafayette Boulevard, Detroit.

CRICKET.
Puritan Machine Co., Detroit, Mich., and N. Y. City.

CROW.
Auto Gear Co., 844 8th Ave., N. Y. City.
Auto Gear & Parts Co., 291-93 Marietta St., Atlanta.
Crow-Elkhart Motor Co., 1116 N. Main St., Elkhart, Ind.
Puritan Machine Co., Detroit, Mich., and N. Y. City.

CROXTON.
Auto Gear & Parts Co., Atlanta, Ga.
Puritan Machine Co., 422 Lafayette Boulevard, Detroit.

CROXTON-KEETON.
Auto Gear Co., 844 8th Ave., N. Y. City.
Puritan Machine Co., 422 Lafayette Boulevard, Detroit.

CUTTING.
Auto Gear Co., 844 8th Ave., N. Y. City.
Auto Gear & Parts Co., Atlanta, Ga.
Erbes, L. C., 2654 W. University Ave., St. Paul, Minn.
Genesee Auto Wrecking Co., 430 Genesee St., Buffalo, N. Y.
Harris Bros. Co., Chicago, Ill.
Puritan Machine Co., 422 Lafayette Boulevard, Detroit.
Wolf Auto Parts & Tire Co., 619 N. Illinois St., Indianapolis, Ind.
Wyckoff Auto Salvage Co., Sioux City, Ia.

DART.
Puritan Machine Co., Detroit, Mich., and N. Y. City.

DAVIS.
Dayton Auto Parts Co., 351-55 West 52nd St., N. Y. City.

DAYTON.
Puritan Machine Co., Detroit, Mich., and N. Y. City.

DEARBORN-DETROIT.
Puritan Machine Co., 422 Lafayette Boulevard, Detroit.

DECAUVILLE.
Gorey & Co., Jos. C., 354 W. 50th St., N. Y.

DEERE-CLARKE.
Levene Motor Co., Philadelphia, Pa.

DE KALE.
Puritan Machine Co., Detroit, Mich., and N. Y. City.

DE LUXE.
Puritan Machine Co., 422 Lafayette Boulevard, Detroit.

DE MOT.
Puritan Machine Co., Detroit, Mich., and N. Y. City.

DESCHAUM.
Puritan Machine Co., Detroit, Mich., and N. Y. City.

DE SOTA.
Zimmerman Mfg. Co., Auburn, Ind.

DE TAMBLE.
American Motors Parts Co., 430 N. Capitol Ave., Indianapolis.
Auto Gear Co., 844 8th Ave., N. Y. City.
Auto Gear & Parts Co., Atlanta, Ga.
De Tumble Motors Co., Indianapolis, Ind.
Puritan Machine Co., 422 Lafayette Boulevard, Detroit.

DETROIT-CHATAM.
Puritan Machine Co., Detroit, Mich., and N. Y. City.

DETROITER.
Puritan Machine Co., Detroit, Mich., and N. Y. City.
Saunders, Ernest W., 27 Stanhope St., Boston, Mass.
Standard Motor Parts Co., Newcastle, Ind.

DOLSON.
Auto Gear Co., 844 8th Ave., N. Y. City.
Auto Gear & Parts Co., Atlanta, Ga.
Puritan Machine Co., Detroit, Mich., and N. Y. City.

DRAGON.
Philadelphia Machine Works, 61-71 Laurel St., Philadelphia.
Puritan Machine Co., 422 Lafayette Boulevard, Detroit.

DREXEL.
Auto Gear & Parts Co., 291-93 Marietta St., Atlanta.

DRUMMOND.
Auto Gear & Parts Co., 291-93 Marietta St., Atlanta.

DUER.
Chicago Coach & Carriage Co., Chicago, Ill.

DUPONT.
Victor Motor Co., York, Pa.

DUROCAR.
Puritan Machine Co., Detroit, Mich., and N. Y. City.

ECLIPSE.
Puritan Machine Co., Detroit, Mich., and N. Y. City.
Toepfer's Sons, Frank, Milwaukee, Wis.

ECONOMY.
Auto Salvage Co., Inc., Kansas City, Mo.

EDWARD-KNIGHT.
Dayton Auto Parts Co., 1777 Broadway, New York.
Willys-Overland, Inc., Toledo.

EDWARDS.
Puritan Machine Co., Detroit, Mich., and N. Y. City.

ELCO.
American Motor Parts Co., Indianapolis, Ind.

ELK.
Puritan Machine Co., Detroit, Mich., and N. Y. City.

ELMORE.
Auto Gear Co., 844 8th Ave., N. Y. City.
Auto Gear & Parts Co., 291-93 Marietta St., Atlanta.
Gorey & Co., Jos. C., 354 W. 50th St., New York.
Puritan Machine Co., 422 Lafayette Boulevard, Detroit.

E. M. F.
Studebaker Corp. of America, Piquette Ave. and Brush St., Detroit.

E-M-F THIRTY.
Carey & Davis, 486 Louisiana Ave., Washington, D. C.
Puritan Machine Co., 422 Lafayette Boulevard, Detroit.

EMPIRE.
Auto Parts So., St. Louis, Mo.
Empire Automobile Co., Indianapolis, Ind.
Puritan Machine Co., Detroit, Mich., and N. Y. City.
York Motor Car Co., York, Pa.

ENGINEER.
American Motors Parts Co., 430 N. Capitol Ave., Indianapolis.
Auto Gear Co., 844 8th Ave., N. Y. City.
Auto Parts Co., St. Louis, Mo.
Erbes, L. E., Motor Car Co., 2654 W. University Ave., St. Paul.
Saunders, Ernest W., 27 Stanhope St., Boston, Mass.

EVERITT.
Puritan Machine Co., 422 Lafayette Boulevard, Detroit.
Saunders, Ernest W., 27 Stanhope St., Boston, Mass.
Standard Motor Parts Co., New Castle, Ind.

EWING.
Gorey & Co., Jos. C., 354 W. 50th St., New York.
Pacific Motor Car Exchange Co., 221 W. 23rd St., N. Y. City.
Puritan Machine Co., 422 Lafayette Boulevard, Detroit.

F. A. L.
Auto Gear Co., 844 8th Ave., N. Y. City.
Puritan Machine Co., 422 Lafayette Boulevard, Detroit.

FALCAR.
Wichita Auto Wrecking Co., 807 W. Douglas Ave., Wichita.

FARMACK.
Auto Gear & Parts Co., 291-93 Marietta St., Atlanta.

FAWICK.
Waukesha Motor Co., Waukesha, Wis.

FIRESTONE COLUMBUS.
Auto Gear Co., 844 8th Ave., N. Y. City.
Auto Gear & Parts Co., Atlanta, Ga.
New Columbus Buggy Co., Columbus, O.

FLANDERS.
Studebaker Corp. of America, Piquette Ave. and Brush St., Detroit.

FLANDERS ELECTRIC.
Levene Motor Co., 2200-18 Diamond St., Philadelphia.

FULLER.
Jackson Motors Corp., Jackson, Mich.

GAETH.
Gaeth Motor Car Co., 2103 Lorain Ave., Cleveland.

GARFORD.
Auto Parts Co., 4116-18 Olive St., St. Louis.
Garford Motor Truck Co., Lima, O.
Puritan Machine Co., 422 Lafayette Boulevard, Detroit.

GENEVA TRUCK.
Geneva Wagon Co., Geneva, N. Y.

G-J-G.
Gorey & Co., Jos. C., 354 W. 50th St., N. Y. C.

- Pacific Motor Car Exchange Co., 221 W. 33rd St., N. Y. C.
Puritan Machine Co., Detroit, Mich., and N. Y. C.
- GLEASON.**
Bauer Machine Works Co., 109 W. 18th St., Kansas City.
- GLIDE.**
Auto Parts Co., St. Louis, Mo.
Avery Co., Peoria, Ill.
- GRABOWSKY.**
Gorey & Co., Jos. C., 354 W. 50th St., New York.
Puritan Machine Co., 422 Lafayette Boulevard, Detroit.
- GRAMM.**
Garford Motor Truck Co., Lima, O.
Puritan Machine Co., 422 Lafayette Boulevard, Detroit.
- GRAMM-LOGAN.**
Garford Motor Truck Co., Wapak Road, Lima, O.
- GREAT EAGLE.**
Auto Salvage Co., 1701-03 Main St., Kansas City.
- GREAT SMITH.**
Bauer Machine Works, Kansas City, Mo.
- GREAT WESTERN.**
Auto Gear Co., 844 8th Ave., N. Y. C.
Auto Gear & Parts Co., Atlanta, Ga.
Great Western Automobile Co., Kalamazoo, Mich.
Maxwell Bros. Auto Salvage Co., St. Louis, Mo.
Puritan Machine Co., 422 Lafayette Boulevard, Detroit.
- GREEN DRAGON.**
Auto Salvage Co., Inc., Kansas City, Mo.
- GROUT.**
Puritan Machine Co., Detroit, Mich., and N. Y. City.
Red Arrow Auto Co., E. River St., Orange, Mass.
- HAL.**
Standard Motor Parts Co., Detroit, Mich.
- HALLIDAY.**
Auto Gear & Parts Co., Atlanta, Ga.
Maxwell Bros. Auto Salvage Co., St. Louis, Mo.
- HART-KRAFT.**
Petrie & Morgenthall, Greencastle, Pa.
- HASSLER.**
Hassler Motor Car Co., Indianapolis, Ind.
- HATFIELD.**
Auto Gear & Parts Co., 291-93 Marietta St., Atlanta.
- HAVERS.**
Auto Gear Co., 844 8th Ave., N. Y. City.
Gorey & Co., Jos. C., 354 W. 50th St., New York.
Puritan Machine Co., 422 Lafayette Boulevard, Detroit.
- HAZARD.**
Puritan Machine Co., 422 Lafayette Boulevard, Detroit.
- HENDERSON.**
Auto Gear Co., 844 8th Ave., N. Y. City.
Auto Gear & Parts Co., Atlanta, Ga.
Buda Co., Harvey, Ill.
Puritan Machine Co., 422 Lafayette Boulevard, Detroit.
Standards Motor Parts Co., Detroit, Mich.
- HENRY.**
Auto Gear Co., 844 8th Ave., N. Y. City.
Auto Gear & Parts Co., Atlanta, Ga.
Gorey & Co., Jos. C., 354 W. 50th St., N. Y.
Muskegon Auto Co., Muskegon, Mich.
Puritan Machine Co., 422 Lafayette Boulevard, Detroit.
- HERFF-BROOKS.**
Holsapfel & Son, Henry, Richmond, Ind.
- HERESHOFF.**
American Motors Parts Co., 430 N. Capitol Ave., Indianapolis.
Gorey & Co., Jos. C., 354 W. 50th St., New York.
Puritan Machine Co., 422 Lafayette Boulevard, Detroit.
- HEWITT.**
International Motor Co., 64th St. & West End Ave., New York.
- HOUP ROCKWELL.**
New Departure Mfg. Co., Bristol, Conn.
- HUDSON FRANKLIN.**
Boston Auto Parts Co., 1221 Dorchester Ave., Boston.
- IMPERIAL.**
Auto Gear Co., 844 8th Ave., N. Y. City.
Auto Gear & Parts Co., 291-93 Marietta St., Atlanta.
Mutual Motors Co., N. Townawanda, N. Y.
Puritan Machine Co., 422 Lafayette Boulevard, Detroit.
- INDIANA.**
Puritan Machine Co., Detroit, Mich., and N. Y. City.
- INTERSTATE.**
Nebraska Iron & Metal Co., 122 Norfolk Ave., Norfolk, Neb.
- JACKSON.**
Auto Salvage Co., 1701-03 Main St., Kansas City.
Jackson Automobile Co., Jackson, Mich.
- JEFFERY.**
Mid-West Auto Parts Co., 1318 W. Broadway, Council Bluffs, Ia.
- JENKINS.**
Puritan Machine Co., Detroit, Mich., and N. Y. City.
- JOHNSON.**
Johnson Service Co., Milwaukee, Wis.
- KEETON.**
Puritan Machine Co., 422 Lafayette Boulevard, Detroit.
Standard Motor Parts Co., Detroit.
- KELSEY.**
Kelsey Motor Co., Hartford, Conn.
- KERMATH.**
Puritan Machine Co., 422 Lafayette Boulevard, Detroit.
- KERMET.**
Keith Bros., Elkhart, Ind.
Knox Motor Co., 53 Wilbraham Rd., Springfield, Mass.
Puritan Machine Co., 422 Lafayette Boulevard, Detroit.
- KNOX.**
Knox Motors Co., Springfield, Mass.
- KOMET.**
Keith Bros., Elkhart, Ind.
Puritan Machine Co., Detroit, Mich., and N. Y. City.
- KRALL.**
Puritan Machine Co., Detroit, Mich., and N. Y. City.
- KREBS.**
Dayton Auto Parts Co., 1777 Broadway, New York.
- KRIT.**
Auto Gear & Parts Co., Atlanta, Ga.
Puritan Machine Co., 412 Lafayette Boulevard, Detroit.
Standard Motor Parts Co., Detroit.
- LAMBERT.**
American Motors Parts Co., Indianapolis, Ind.
Auto Parts Co., St. Louis, Mo.
- LANE TRUCK.**
Kalamazoo Motors Corp., Kalamazoo, Mich.
- LANDSEN-ELECTRIC.**
Kelland Motor Car Co., 58 Elm St., Newark, N. J.
- LENOX.**
Auto Gear & Parts Co., Atlanta, Ga.
Puritan Machine Co., 422 Lafayette Boulevard, Detroit.
- LEWIS.**
American Motor Parts Co., Indianapolis, Ind.
Puritan Machine Co., 422 Lafayette Boulevard, Detroit.
- LINCOLN TRUCK.**
Hannon, J. E., 24 Mass. Ave., Detroit, Mich.
- LION.**
Lion Motor Parts Co., Philadelphia.
- LITTLE-FOUR.**
Puritan Machine Co., 422 Lafayette Boulevard, Detroit.
- LITTLE SIX.**
Puritan Machine Co., Detroit, Mich., and N. Y. City.
- LOGAN.**
Garford Motor Truck Co., Lima, O.
Gramm Motor Truck Co., Lima, O.
- LONGEST.**
Longest Bros. Co., 725-29 S 3rd St., Louisville, Ky.
- LOZIER.**
Losier Motor Car Co., Fort and Sixth Sts., Detroit, Mich.
Puritan Machine Co., 422 Lafayette Boulevard, Detroit.
- L. P. C.**
American Motor Parts Co., Indianapolis, Ind.
- LUVERNE (1913).**
Auto Gear Co., 844 8th Ave., N. Y. City.
Auto Gear & Parts Co., Atlanta, Ga.
- LYONS-KNIGHT.**
Wolf Auto Parts & Tire Co., 619 N. Illinois St., Indianapolis, Ind.
- MCINTYRE.**
Puritan Machine Co., 422 Lafayette Boulevard, Detroit.
- MAIS TRUCK.**
American Motor Parts Co., Indianapolis, Ind.
- MARATHON.**
Auto Gear Co., 844 8th Ave., N. Y. City.
Genesee Auto Wrecking Co., 430 Genesee St., Buffalo, N. Y.
Marathon Service Co., 14th & Clinton Sts., Nashville, Tenn.
Puritan Machine Co., 422 Lafayette Boulevard, Detroit.
Saunders, Ernest W., 27 Stanhope St., Boston, Mass.
- MARION.**
American Motors Parts Co., 430 N. Capitol Ave., Indianapolis.
Auto Gears & Parts Co., Atlanta, Ga.
Gorey & Co., Jos. C., 354 W. 50th St., New York.
Longaker Co., V. A., 448-50 N. Capitol Ave., Indianapolis.
Mutual Motors Co., N. Townawanda, N. Y.
Puritan Machine Co., 422 Lafayette Boulevard, Detroit.
Stutz Motor Car Co., 2450 Michigan Ave., Chicago, Ill.
- MARION-HANDLEY.**
Gorey & Co., Jos. C., 354 W. 50th St., N. Y. City.
Mutual Motors Co., N. Townawanda, N. Y.
- MARQUETTE.**
Puritan Machine Co., 422 Lafayette Boulevard, Detroit.
- MARRON.**
Puritan Machine Co., Detroit, Mich., and N. Y. City.
- MARVEL.**
Puritan Machine Co., Detroit, Mich., and N. Y. City.
- MASON.**
Erbes, L. C., 2654 W. University Ave., St. Paul, Minn.
Puritan Machine Co., 422 Lafayette Boulevard, Detroit.
Saunders, Ernest W., 27 Stanhope St., Boston, Mass.
Standard Motor Parts Co., Detroit.
- MATHER.**
Puritan Machine Co., Detroit, Mich., and N. Y. City.
- MATHESON.**
Matheson Co., Frank F., 694 Wyoming Ave., Wilkes-Barre, Pa.
Puritan Machine Co., 422 Lafayette Boulevard, Detroit.
- MAXWELL (OLD).**
Akeley-Steele Co., 79 Galena Blvd., Aurora, Ill.
Auto Gear Co., 844 8th Ave., N. Y. City.
Auto Gear & Parts Co., Atlanta, Ga.
Auto Tire & Parts Co., Cape Girardeau, Mo.
Genesee Auto Wrecking Co., 430 Genesee St., Buffalo, N. Y.
Mid-West Auto Parts Co., 1318 W. Broadway, Council Bluffs, Ia.
Nebraska Iron & Metal Co., 122 Norfolk Ave., Norfolk, Neb.
Pacific Motor Car Exchange Co., 221 W. 53rd St., N. Y. City.
Puritan Machine Co., Detroit, Mich., and N. Y. City.
Saunders, Ernest W., 27 Stanhope St., Boston, Mass.
Standard Motor Parts Co., Newcastle, Ind.
- MAXWELL-BRISCOE.**
Akeley-Steele Co., 79 Galena Blvd., Aurora, Ill.
Mid-West Auto Parts Co., 1318 W. Broadway, Council Bluffs, Ia.
Pacific Motor Car Exchange Co., 221 W. 53rd St., N. Y. City.
Standard Motor Parts Co., Newcastle, Ind.
- MATTAG.**
Puritan Machine Co., 422 Lafayette Boulevard, Detroit.
- MERCEDES.**
Standard Motor Parts Co., Detroit, Mich.
- MERCHANT.**
Connecticut Auto Parts Co., 553 Franklin Ave., Hartford, Conn.
- METEOR.**
Auto Gear Co., 844 8th Ave., N. Y. City.
Auto Gear & Parts Co., Atlanta, Ga.

Puritan Machine Co., Detroit, Mich., and N. Y. City.
Saunders, Ernest W., 27 Stanhope St., Boston, Mass.

METZGER.

Puritan Machine Co., Detroit Mich., and N. Y. City.
Standard Motor Parts Co., Detroit, Mich.

MICHIGAN.

Auto Gear Co., 844 8th Ave., N. Y. City.
Auto Gear & Parts Co., Atlanta, Ga.
Dauch Mfg. Co., 308 W. Water St., Sandusky, O.
Gorey & Co., Jos. C., 354 W. 50th St., N. Y. City.
Philadelphia Machine Works, 61-71 Laurel St., Philadelphia.
Puritan Machine Co., 422 Lafayette Boulevard, Detroit.
Standard Motor Parts Co., Detroit, Mich.

MIDDLEBY.

Goldberg, H., 1420 S. 8th St., Philadelphia, Pa.
Levengood, A. J., 153 N. 4th St., Reading, Pa.
Puritan Machine Co., Detroit Mich., and N. Y. City.

MIDLAND.

Auto Gear Co., 844 8th Ave., N. Y. City.
Auto Gear & Parts Co., 291-93 Marietta St., Atlanta.
Bergdoll Co., Louis J., Philadelphia, Pa.
Levene Motor Co., 2200-18 Diamond St., Philadelphia.
Lion Motor Parts Co., Philadelphia, Pa.
Maxwell Bros. Auto Salvage Co., St. Louis, Mo.
Midland Motor Co., Philadelphia, Pa.
Nebraska Iron & Metal Co., 122 Norfolk Ave., Norfolk, Neb.
Puritan Machine Co., 422 Lafayette Boulevard, Detroit.

MIDLAND TRUCK.

Midland Motor Car & Truck Co., Box 152, Oklahoma City, Okla.

MIER.

Mier Carriage & Buggy Co., Ligonier, Ind.

MILLER.

Auto Gear & Parts Co., Atlanta, Ga.
Puritan Machine Co., 422 Lafayette Boulevard, Detroit.

MILWAUKEE.

Erbes, L. C., 2654 W. University Ave., St. Paul, Minn.
Harris Bros. Co., Chicago, Ill.

MOGUL.

Auto Salvage Co., 1701-03 Main St., Kansas City.

MOLINE.

Auto Parts Co., 4116-18 Olive St., St. Louis.

MONARCH.

Puritan Machine Co., 422 Lafayette Boulevard, Detroit.

MOORE.

Puritan Machine Co., Detroit, Mich., and N. Y. City.

MORA.

Gorey & Co., Jos. C., 354 W. 50th St., N. Y. City.
Philadelphia Machine Works, 61-71 Laurel St., Philadelphia.

MORGAN.

Steele, W. M., 98-100 Beacon St., Worcester, Mass.

MOYER.

Auto Gear Co., 844 8th Ave., N. Y. City.
Auto Gear & Parts Co., Atlanta, Ga.
Puritan Machine Co., Detroit, Mich., and N. Y. City.

NANCE.

Gorey & Co., Jos. C., 354 W. 50th St., New York.

NIAGARA.

Auto Gear & Parts Co., 291-93 Marietta St., Atlanta.

NORTHERN.

Puritan Machine Co., 422 Lafayette Boulevard, Detroit.

NORTHWESTERN.

Puritan Machine Co., 422 Lafayette Boulevard, Detroit.

NYBERG.

Auto Gear & Parts Co., Atlanta, Ga.
Puritan Machine Co., 422 Lafayette Boulevard, Detroit.

OHIO.

Auto Gear Co., 844 8th Ave., N. Y. City.
Auto Gear & Parts Co., Atlanta, Ga.
Puritan Machine Co., 422 Lafayette Boulevard, Detroit.
Wyckoff Auto Salvage Co., Sioux City, Ia.

OLIVER.

Puritan Machine Co., Detroit, Mich., and N. Y. City.

OMAHA.

Auto Gear & Parts Co., Atlanta, Ga.
Puritan Machine Co., 422 Lafayette Boulevard, Detroit.

ORIENT.

Metz-Friction Service, Waltham, Mass.

ORSON.

Pacific Motor Car Exchange Co., 221 W. 23rd St., N. Y. City.

OSWALD.

Auto Salvage Co., Inc., Kansas City, Mo.

OTTO.

Jones, Mark W., 53rd and Lansdowne Ave., Philadelphia, Pa.

OWEN.

Puritan Machine Co., 422 Lafayette Boulevard, Detroit.

PACKERS.

Pacific Motor Car Exchange Co., 221 W. 23rd St., N. Y. City.
Puritan Machine Co., Detroit, Mich., and N. Y. City.

PAIGE (THREE-CYLINDER.)

Auto Tire & Parts Co., Cape Girardeau, Mo.
Puritan Machine Co., Detroit, Mich., and N. Y. City.

PALMER-MOORE.

Moffitt's Sons, B. O., Binghamton, N. Y.

PALMER-SINGER.

Auto Gear & Parts Co., Atlanta, Ga.
Gorey & Co., Jos. C., 354 W. 50th St., N. Y. City.
Puritan Machine Co., 422 Lafayette Boulevard, Detroit.
Singer Motor Co., 102-04 West End Ave., New York.

PANHARD.

Babel, L., 371 E. 29th St., Chicago, Ill.
Pacific Motor Car Exchange Co., 221 W. 23rd St., N. Y. City.

PARRY.

Auto Gear Co., 844 8th Ave., N. Y. City.
Auto Gear & Parts Co., Atlanta, Ga.
Auto Parts Co., 4116-18 Olive St., St. Louis.
Pathfinder Co., Indianapolis.
Puritan Machine Co., 422 Lafayette Boulevard, Detroit.
Southern Welding Co., Waco, Tex.

PARTIN-PALMER.

Auto Tire & Parts Co., Cape Girardeau, Mo.
Commonwealth Motors Co., 326 W. Madison St., Chicago, Ill.
Saunders, Ernest W., 27 Stanhope St., Boston, Mass.

PATHFINDER.

American Motors Parts Co., 430 N. Capitol Ave., Indianapolis.
Mid-West Auto Parts Co., 1313 W. Broadway, Council Bluffs, Ia.
Pathfinder Co., The, Indianapolis, Ind.

PAULDING.

Anchor Motor Car Co., St. Louis, Mo.

PEABODY.

Puritan Machine Co., Detroit, Mich., and N. Y. City.

PENN.

Auto Gear Co., 844 8th Ave., N. Y. City.
Auto Gear & Parts Co., Atlanta, Ga.
Ruda Co., Harvey, Ill.
Pacific Motor Car Exchange Co., 221 W. 23rd St., N. Y. City.
Puritan Machine Co., Detroit, Mich., and N. Y. City.

PENNSYLVANIA.

Pacific Motor Car Exchange Co., 221 W. 23rd St., N. Y. City.
Puritan Machine Co., 422 Lafayette Boulevard, Detroit.

PENN-THIRTY.

Puritan Machine Co., 422 Lafayette Boulevard, Detroit.

PERU.

Puritan Machine Co., 422 Lafayette Boulevard, Detroit.

PETREL.

Council Bluffs Auto Parts Co., Council Bluffs, Ia.
Filer & Stowell, Milwaukee.

PIERCE-RACINE.

Case Threshing Machine Co., J. I., Racine, Wis.
Puritan Machine Co., Detroit, Mich., and N. Y. City.

POPE-HARTFORD.

Council Bluffs Auto Parts Co., Council Bluffs, Ia.
Genesee Auto Wrecking Co., 430 Genesee St., Buffalo, N. Y.

Hartford Motor Car Co., 410 Main St., Hartford, Conn.
Maxwell Bros. Auto Salvage Co., St. Louis, Mo.

Pacific Motor Car Exchange Co., 221 W. 23rd St., N. Y. City.
Puritan Machine Co., 422 Lafayette Boulevard, Detroit.

Rosenfeld, J., 521 Sixth St. (S. Boston), Boston.

Saunders, Ernest W., 27 Stanhope St., Boston, Mass.

Walker & Barkman Mfg. Co., Hartford.

POPE-TOLEDO.

Maxwell Bros. Auto Salvage Co., St. Louis, Mo.

Pacific Motor Car Exchange Co., 221 W. 23rd St., N. Y. City.

Puritan Machine Co., Detroit, Mich., and N. Y. City.

POPE-TRIBUNE.

Hartford Motor Car Co., 410 Main St., Hartford, Conn.
Puritan Machine Co., Detroit, Mich., and N. Y. City.

POSS.

Auto Parts Co., St. Louis, Mo.
Puritan Machine Co., Detroit, Mich., and N. Y. City.

PRATT-ELKHART.

Elkhart Carriage & Motor Car Co., Elkhart, Ind.

PULLMAN.

Auto Parts Co., St. Louis, Mo.
Auto Tire & Parts Co., Cape Girardeau, Mo.

Bergdoll Co., Louis J., Philadelphia, Pa.
Genesee Auto Wrecking Co., 430 Genesee St., Buffalo, N. Y.

Levene Motor Co., 2200-18 Diamond St., Philadelphia.

Lion Motor Parts Co., Philadelphia, Pa.
Midland Motor Co., Philadelphia, Pa.

Mid-West Auto Parts Co., 1313 W. Broadway, Council Bluffs, Ia.

Pullman Motor Car Co., York, Pa.
Puritan Machine Co., 422 Lafayette Boulevard, Detroit.

Saunders, Ernest W., 27 Stanhope St., Boston, Mass.

York Motor Car Co., York, Pa.

PUNGS-FINCH.

Pungs-Finch Auto & Gas Engine Co., Detroit, Mich.

Puritan Machine Co., Detroit, Mich., and N. Y. City.

QUEEN.

Puritan Machine Co., 422 Lafayette Boulevard, Detroit.

RAINIER.

Garford Motor Truck Co., Wapaka Road, Lima, O.

Pacific Motor Car Exchange Co., 221 W. 23rd St., N. Y. City.

Puritan Machine Co., 422 Lafayette Boulevard, Detroit.

RAMBLER.

Akeley-Steele Co., 79 Galena Blvd., Aurora, Ill.

Auto Parts Co., St. Louis, Mo.
Council Bluffs Auto Parts Co., Council Bluffs, Ia.

Maxwell Bros. Auto Salvage Co., St. Louis, Mo.

Mid-West Auto Parts Co., 1313 W. Broadway, Council Bluffs, Ia.

Wolf Auto Parts & Tire Co., 619 N. Illinois St., Indianapolis, Ind.

Wyckoff Auto Salvage Co., Sioux City, Ia.

RANDOLPH.

DeKalb Wagon Co., DeKalb, Ill.

Puritan Machine Co., 422 Lafayette Boulevard, Detroit.

Randolph Motor Truck Co., Flint, Mich.

RAPID.

Puritan Machine Co., Detroit, Mich., and N. Y. City.

RAYFIELD.

Auto Parts Co., 4116-18 Olive St., St. Louis.

R. C. H.

Auto Gear Co., 844 8th Ave., N. Y. City.

Auto Parts Co., St. Louis, Mo.
Gorey & Co., Jos. C., 354 W. 50th St., N. Y. City.

Mid-West Auto Parts Co., 1313 W. Broadway, Council Bluffs, Ia.

Pacific Motor Car Exchange Co., 221 W. 23rd St., N. Y. City.

Philadelphia Machine Works, Philadelphia, Pa.

Puritan Machine Co., Detroit, Mich., and N. Y. City.

R. C. H. Corp., Detroit, Mich.
Saunders, Ernest W., 27 Stanhope St., Boston, Mass.

Wolf Auto Parts & Tire Co., 619 N. Illinois St., Indianapolis, Ind.

READING.

Goldberg, H., 1420 S. 8th St., Philadelphia, Pa.

Puritan Machine Co., Detroit, Mich., and N. Y. City.

REED.

Puritan Machine Co., Detroit, Mich., and N. Y. City.

REGAL.

Auto Parts Co., St. Louis, Mo.
Genesee Auto Wrecking Co., 430 Genesee St., Buffalo, N. Y.

Levine Motor Co., 2200-18 Diamond St., Philadelphia.

Mid-West Auto Parts Co., 1315 W. Broadway, Council Bluffs, Ia.

Puritan Machine Co., Detroit, Mich., and N. Y. City.

Saunders, Ernest W., 27 Stanhope St., Boston, Mass.

RELIABLE-DAYTON.

Puritan Machine Co., 422 Lafayette Boulevard, Detroit.

RELIANCE.

Puritan Machine Co., Detroit, Mich., and N. Y. City.

REPUBLIC.

Auto Gear Co., 844 8th Ave., N. Y. City.
Republic Motor Car Co., Youngstown, O.

RICHMOND.

Mid-West Auto Parts Co., 1315 W. Broadway, Council Bluffs, Ia.

RIDER-LEWIS.

Longaker Co., V. A., 448-50 N. Capitol Ave., Indianapolis.

Puritan Machine Co., Detroit, Mich., and N. Y. City.

ROSS.

Great Western Auto Co., Kalamazoo, Mich.

ROYAL TOURIST.

Auto Parts Co., 4116-18 Olive St., St. Louis.
Puritan Machine Co., Detroit, Mich., and N. Y. City.

Royal Tourist Co., 72nd St. and St. Clair Ave., Cleveland, O.

RUSH.

Levene Motor Co., 2200-18 Diamond St., Philadelphia.

RUSSELL.

Auto Gear Co., 844 8th Ave., N. Y. City.
Auto Gear & Parts Co., Atlanta, Ga.

SAMPSON.

Auto Gear & Parts Co., Atlanta, Ga.
Puritan Machine Co., Detroit, Mich., and N. Y. City.

Saunders, Ernest W., 27 Stanhope St., Boston, Mass.

Standard Motor Parts Co., New Castle, Ind.

SAMSON.

Auto Gear Co., 844 8th Ave., N. Y. City.

SANDUSKY.
Dauch Mfg. Co., Sandusky, O.

SAVOY.

Barney's Auto Parts Co., 233 W. 50th St., N. Y. City.

Saunders, Ernest W., 27 Stanhope St., Boston, Mass.

SAYBROOK.

Barney's Auto Parts Co., 233 W. 50th St., N. Y. City.

Saunders, Ernest W., 27 Stanhope St., Boston, Mass.

SCHACHT.

Auto Gear Co., 844 8th Ave., N. Y. City.
Auto Gear & Parts Co., Atlanta, Ga.

Genesee Auto Wrecking Co., 430 Genesee St., Buffalo, N. Y.

Puritan Machine Co., 422 Lafayette Boulevard, Detroit.

Schacht Motor Truck Co., G. A., Cincinnati, O.

SCRIPPS-BOOTH CYCLE CAR.

Puritan Machine Co., 422 Lafayette Boulevard, Detroit.

SELDEN.

Auto Gear Co., 844 8th Ave., N. Y. City.
Auto Gear & Parts Co., 291-93 Marietta St., Atlanta.

Genesee Auto Wrecking Co., 430 Genesee St., Buffalo, N. Y.

Gorey & Co., Jos. C., 354 W. 50th St., N. Y. City.

Maxwell Bros. Auto Salvage Co., St. Louis, Mo.

Pacific Motor Car Exchange Co., 221 W. 53rd St., N. Y. City.

Puritan Machine Co., 422 Lafayette Boulevard, Detroit.

S. G. V.

Pacific Motor Car Exchange Co., 221 W. 53rd St., N. Y. City.

Puritan Machine Co., Detroit, Mich., and N. Y. City.

SILENT-KNIGHT.

Wolf Auto Parts & Tire Co., 619 N. Illinois St., Indianapolis, Ind.

SOUTHERN.

Puritan Machine Co., 422 Lafayette Boulevard, Detroit.

Southern Auto & Equipment Co., Atlanta, Ga.

SPAULDING.

Puritan Machine Co., Detroit, Mich., and N. Y. City.

SPEEDWELL.

Auto Gear & Parts Co., 291-93 Marietta St., Atlanta.

Puritan Machine Co., 422 Lafayette Boulevard, Detroit.

SPHINX.

Auto Gear Co., 844 8th Ave., N. Y. City.
Auto Gear & Parts Co., Atlanta, Ga.

York Motor Car Co., York, Pa.

SPRINGFIELD.

Haas Electric & Mfg. Co., 305-07 E. Monroe St., Springfield, Ill.

STAFFORD.

Auto Salvage Co., 1701-03 Main St., Kansas City.

STANDARD.

St. Louis Car Co., 5200 N. Second St., St. Louis.

STANDARD SIX.

Auto Gear Co., 844 8th Ave., N. Y. City.
Auto Gear & Parts Co., Atlanta, Ga.

Puritan Machine Co., Detroit, Mich., and N. Y. City.

St. Louis Car Co., 8000 N. Broadway, St. Louis.

STAR.

Mier Carriage & Buggy Co., Marion, Ind.
Puritan Machine Co., Detroit, Mich., and N. Y. City.

STAVEL.

Auto Gear Co., 844 8th Ave., N. Y. City.
Auto Gear & Parts Co., Atlanta, Ga.

Auto Parts Co., St. Louis, Mo.
Puritan Machine Co., Detroit, Mich., and N. Y. City.

Staver Co., 106 W. 55th St., Chicago, Ill.

STEARNS-KNIGHT.

Maxwell Bros. Auto Salvage Co., St. Louis, Mo.

STERLING.

Keith Bros., Elkhart, Ind.
Puritan Machine Co., 422 Lafayette Boulevard, Detroit.

STEVENS-DURYEA.

Mid-West Auto Parts Co., 1315 W. Broadway, Council Bluffs, Ia.

Puritan Machine Co., Detroit, Mich., and N. Y. City.

Stevens-Duryea Co., Chicopee Falls, Mass.
Stevens-Duryea Co., 72 12th St., San Francisco, Cal.

Stevens-Duryea Service, Inc., 219 E. 67th St., N. Y. City.

STODDARD-DAYTON.

Auto Gear & Parts Co., Atlanta, Ga.
Barney's Auto Parts Co., 233 W. 50th St., N. Y. City.

Puritan Machine Co., Detroit, Mich., and N. Y. City.

Standard Motor Parts Co., New Castle, Ind.

STRATFORD.

Barney's Auto Parts Co., 233 W. 50th St., N. Y. City.

Saunders, Ernest W., 27 Stanhope St., Boston, Mass.

SUBURBAN.

Auto Gear Co., 844 8th Ave., N. Y. City.
Auto Gear & Parts Co., Atlanta, Ga.

Puritan Machine Co., 422 Lafayette Boulevard, Detroit.

SULTAN.

Gorey & Co., Jos. C., 354 W. 50th St., N. Y. City.

Puritan Machine Co., 422 Lafayette Boulevard, Detroit.

SUN.

Automotive Corp., Toledo, O.

THOMAS.

Auto Gear Co., 844 8th Ave., N. Y. City.
Auto Gear & Parts Co., Atlanta, Ga.

Maxwell Bros. Auto Salvage Co., St. Louis, Mo.

Puritan Machine Co., Detroit, Mich., and N. Y. City.

Southern Welding Co., Waco, Tex.
Thomas Motor Car Co., E. R., Buffalo, N. Y.

THOMAS-DETROIT.

Puritan Machine Co., Detroit, Mich., and N. Y. City.

TINCHER.

Chicago Coach & Carriage Co., Chicago, Ill.

TOLEDO.

Dayton Auto Parts Co., 1777 Broadway, New York.

TOURAIN.

Gorey & Co., Jos. C., 354 W. 50th St., New York.

TOURIST.

Burt Motor Car Co., W. J., Pico & Hope Sts., Los Angeles.

Puritan Machine Co., Detroit, Mich., and N. Y. City.

TRAVELER.

Single Center Buggy Co., Fifth & Locust Sts., Evansville, Ind.

TRUMBULL.

Levene Motor Co., 2200-18 Diamond St., Philadelphia.

TWOMBLY.

Driggs-Seabury Ordnance Co., Sharon, Pa.
Puritan Machine Co., Detroit, Mich., and N. Y. City.

VAN DYKE.

Puritan Machine Co., Detroit, Mich., and N. Y. City.

VICTOR.

Auto Gear & Parts Co., 291-93 Marietta St., Atlanta.

VIRGINIAN.

Auto Gear Co., 844 8th Ave., N. Y. City.
Auto Gear & Parts Co., Atlanta, Ga.

VULCAN.

Savage Arms Corp., Sharon, Pa.

WACO.

Grant Machine Works, 5401 32nd Ave., S., Seattle, Wash.

WAGENHALL.

Puritan Machine Co., 422 Lafayette Boulevard, Detroit.

Riverside Machinery Depot, Detroit, Mich.

WAHL.

Puritan Machine Co., 422 Lafayette Boulevard, Detroit.

WALTERS.

Auto Gear Co., 844 8th Ave., N. Y. City.
Auto Gear & Parts Co., Atlanta, Ga.

WALTHAM-ORIENT.

Metz-Friction Service, Waltham, Mass.

WARREN.

Auto Gear & Parts Co., Atlanta, Ga.
Gorey & Co., Jos. C., 354 W. 50th St., New York.

Puritan Machine Co., 422 Lafayette Boulevard, Detroit.

WASHINGTON.

Puritan Machine Co., Detroit, Mich., and N. Y. City.

WAVERLY ELECTRIC.

Longaker Co., V. A., 448-50 N. Capitol Ave., Indianapolis.

WAYNE.

Puritan Machine Co., 422 Lafayette Boulevard, Detroit.

WELCH-DETROIT.

Puritan Machine Co., 422 Lafayette Boulevard, Detroit.

WELCH-PONTIAC.

Puritan Machine Co., 422 Lafayette Boulevard, Detroit.

WESTERN.

Puritan Machine Co., Detroit, Mich., and N. Y. City.

WHITE STEAMER.

Akeley-Steele Co., 79 Galena Blvd., Aurora, Ill.

WHITING.

Auto Gear & Parts Co., 291-93 Marietta St., Atlanta, Ga.

Puritan Machine Co., 422 Lafayette Boulevard, Detroit.

WOODWORTH.

Puritan Machine Co., 422 Lafayette Boulevard, Detroit, Mich.

YALE.

Puritan Machine Co., Detroit, Mich., and N. Y. City.

ZIMMERMAN.

Auto Gear Co., 844 Eighth Ave., New York, N. Y.

Auto Gear & Parts Co., 291-93 Marietta St., Atlanta.

Council Bluffs Auto Parts Co., Council Bluffs, Ia.

STOCK FARMERS.

(Continued from Page 318.)

in the nation, being operated under the business management of a woman.

There is Sam Jordan at Danville, Ind., a prominent horse man a few years ago. He has since gone in for dairy cows, principally Jerseys, and for red hogs. He has abandoned his horses for the tractor because, as he said, he could not stand to see them abused as they have to be abused during the difficult spring work in his section. C. H. Mitchell of Marshfield let the prettiest team of Percheron mares one ever saw stand about the stable lot while he put his fields in shape with a tractor this spring, and Espy Brothers, probably as well and favorably known in the horse industry as any of the rest, except Crouch and Nave farms, have retired from the horse business and taken up tractor grain farming in connection with their fancy stock, cattle and hogs. This used to be the "show" farm between Flora and Brookston, and their animals were known throughout the nation. Their dams and sires came from the Crouch stables—Percherons, Belgians and coach, and they were horse men through and through. The humane side, as well as the business side of the tractor farming game made its appeal and they gave up their horses, cleared their stables and have since filled their stalls with fancy stock, and though the change has been made but a short time they are fast becoming recognized in this newer undertaking.

A survey of the tractor situation in the Indianapolis factory branch and jobbing district seems to support what is claimed to be a fact concerning the unprecedented demand for tractors in the Hoosier state this season. It has been said and it appears to be true that more tractors of all makes and sizes have been sold to Indiana farmers this season, up to May 1st, than during any previous 12 months' season in the history of the industry. And isn't it significant indeed that this new demand should come from the farms of the world's best known and most suc-

cessful horse breeders? Isn't it abundant and sufficient evidence of the efficacy of the modern tractor? Isn't it a testimonial of its growing worth?

CREDIT MERCHANDISING.

(Continued from Page 312.)

outstanding represent about 1/15 hundred of all the bank loans in this country. As of Dec. 31, 1921, the company shows \$31,933,965 total assets, of which \$3,476,207 is cash and \$27,261,642 secured receivables. Capital and surplus is \$5,010,550 and discounted obligations amount to \$25,614,627. Reserves are \$426,015.

The total amount of financial accommodation extended by General Motors Acceptance Corporation from inception to April 1, 1922, is \$227,743,664, divided as follows: Foreign, \$27,897,700; retail, \$107,802,979; wholesale, \$92,042,985. This means that under the GMAC plans there have been financed General Motors cars of a retail value in excess of \$300,000,000.

The board of directors of the General Motors Acceptance Corporation includes executives of E. I. du Pont de Nemours & Company and the General Motors Corporation. Among the directors of the Acceptance Corporation are Pierre S. du Pont, chairman of the board of E. I. du Pont de Nemours & Company, and president of General Motors Corporation; Irene du Pont, president of E. I. du Pont de Nemours & Company; Lamont du Pont, vice president of E. I. du Pont de Nemours & Company; John J. Raskob, chairman of the finance committee and vice president of General Motors Corporation and also a vice president of the E. I. du Pont de Nemours & Company; J. Amory Haskell, a vice president of both the General Motors Corporation and E. I. du Pont de Nemours & Company. Alfred H. Swayne, vice president of General Motors Corporation, is chairman of the board of the Acceptance Corporation.

HIGH SCHOOLS TO STUDY.

(Continued from Page 301.)

Coincident with this exhibit, which is the gift to the committee of Harvey S. Firestone, the Bureau of Public Roads has had prepared five sets of a highway exhibit, illustrating in physical form the varying aspects of highway construction, maintenance and use. These exhibits are also accompanied by photographs and will be shortly supplemented by five additional sets now in process of modeling.

A third exhibit, this one designed to show the steps in the manufacture of the car is to be prepared by the National Automobile Chamber of Commerce under the direction of George M. Graham of the Highways

Committee.

All three of these exhibits are constructed with a view to meeting educational needs and have been surveyed by leading educators. While the exhibits of the Bureau of Public Roads are open to any public meeting without charge, as is the case in all governmental projects, they with the others will be widely used in class room work by educators teaching the principles of highway transport.

Next Conference at Alabama.

The next regional conference on highway transport which will be held under the auspices of the committee is scheduled for the University of Alabama some time this summer, when highway problems of particular interest to the South will be under observation.

The second national conference on this subject is planned for October of this year in Washington, D. C., when it is expected a representative group will join in the discussions. A programme committee has been named to arrange for this event and details will be announced when formulated.

The personnel of the Highway and Highway Transport Education Committee is as follows:

John J. Tigert, chairman, U. S. Commissioner of Education.

Thos. H. MacDonald, chief, Bureau of Public Roads, Department of Agriculture.

F. C. Boggs, colonel, Corps of Engineers, U. S. A., representing the War Department.

Roy D. Chapin, representing the National Automobile Chamber of Commerce.

F. L. Bishop, dean of engineering, University of Pittsburgh, representing the Society for the Promotion of Engineering Education.

Harvey S. Firestone, representing the Rubber Associations of America.

W. S. Keller, state highway engineer of Alabama, representing the American Association of State Highway Officials.

H. W. Alden, vice president, Timken Axle Company, representing the Society of Automotive Engineers.

W. C. John, secretary.



"HERE'S something interesting," said O. M. Vett, as we sat under an apple tree in his back yard one hot Sunday morning.

I looked at the item in the newspaper indicated by his pointing finger.

"What's interesting about it?" I asked. "All I can see is that some wheel concern in Dayton is retaining a man to assist them in their marketing plans. Is that what you refer to?"

"Exactly," answered Vett. "Does't it mean anything to you?" he wanted to know.

"I don't know that it does," I returned, somewhat puzzled. "What's funny about it?"

"Nothin's funny," grunted Vett, somewhat scornfully. And then, apparently somewhat displeased at my failure to see the same thing that he did in the announcement, he started to explain.

"To me this short paragraph in the paper means more than the simple fact it sets forth. It is rather an indication of the manner in which modern business is awakening to its responsibilities," he said, glancing at me over his glasses.

"A few years ago no one would have thought of engaging the services of a professional 'sales surveyor.' Everything was going good; markets were available on every hand and there wasn't the slightest doubt but that anything manufactured could be disposed of to a waiting public. Finally, however, things began to slump. Cancellations and business failures followed one another—manufacturers were in a state of mind bordering on panic and while they'll never convince me that business, as compared with the years before the war was so awful

bad, nevertheless it was a whole lot different than it has been for several years.

"For a while conditions were anything but stable. Finally, however, a few adventurous souls got casting around for ways out of the muddle. They got a good firm hold on a lot of basic ideas—old fashioned selling methods backed by honest hustle, and the result is that the majority of the real business houses are still doing business at the same old stand.

"The business man—he who is entitled to be dignified by that title is not yet content. He knows there's a lot of trade that he isn't getting and appreciating the fact is looking around for ways and means to get hold of it. He's willing to admit that someone else's experience is worth having—that he doesn't know everything and the result is that he is hiring specialists in merchandising to help him sell his goods.

"These specialists know just what they're up against—the many problems they're bound to encounter and how to circumvent them and the man who is broad-minded enough to ask their aid is cashing in on their expert advice. In one sense these specialists in merchandising are a new development of business—an advancement—and when you see a business house like this firm in Dayton referred to in the clipping engaging their services you can make up your mind that the proprietor is a live business man who is taking advantage of every new opportunity for legitimate profit that presents itself. The reason I showed you the clipping is because to my mind it signifies progress and I'm not too old to appreciate the fact. Now do you see what I mean?" he finished.

"I believe I do—at that," I said.

TIRE BUSINESS GOOD.

AKRON, June 14.—The influx of labor of all kinds to this city is great and, as a result, the manufacturers are in the enviable position of being able to select skilled workmen, and more are working today than since the days of the boom when every plant was just producing, producing, and producing, piling up that surplus which proved too embarrassing when the slump came. There is not go-

ing to be any slump this time, as the tire makers are working only to fill orders and take care of the visible demand. They are not going out to see how big production they can attain.

The present boom is the result of the greatly increased sale in new cars and the natural increase in orders for new car equipment, and not for several years has the demand been what it is today.

It is estimated that Akron's output of tires for the calendar year will exceed 15,000,000 shoes, which is three times the output of a year ago.

And, what is more, this figure will be attained by the use of about one third the workmen used in the boom period. For instance, one plant today has 10,000 on its pay roll and is building 26,000 tires a day. Three years ago it carried 30,000 on its pay roll and its highest production was 33,000 shoes a day.

Greater efficiency and less overhead accounts for the present low prices of tires.

Almost all the plants in Akron are overbuilt for present day production, and they could make 15,000 shoes a day more if occasion demanded, but such is not the case and so none is endeavoring to make records.

While visiting the Goodyear plant recently there was a wonderful, continuous and loud blowing of whistles celebrating the construction of the 45,000,000th tire made in that plant since its establishment in 1898. Goodyear is coming and coming strong, producing 20,000 tires a day.

Goodrich was never in a stronger financial position than she is at the present time having cancelled the greater part of her indebtedness and producing 18,000 tires a day as well as no end of commercial rubber goods.

Firestone is credited with making 22,000 tires a day with prospects of an immediate increase.

Miller is going stronger than ever, making 3,000 tires a day, and preparing for an increase.

General, which never figured as a big producer, is putting out 8,000 a day, which is away above her normal. General never did build for the motor manufacturer being content with high class retail business.

Mason at Kent is going stronger; this in a nut shell, is the story of Akron. Kelly-Springfield, although operating here on a small scale, is no longer considered as an Akron institution, as she has carried the greater part of her plant to Cumberland, Md., and is working full time there.

Akron is again alive and active.

Harry Bijur, until recently attorney for the Trego Motors Corporation, New Haven, Conn., has opened an office under the firm name of Bijur & Herts, 29 Broadway, New York City, for the practice of law.

C. N. Mitchell has severed his connection with the Grant Motor Car Co Corporation, Cleveland, where he was chief engineer in the truck division. His plans for the future have not been announced.

Henry Tiedemann has been appointed superintendent of the Chace Electrical Service Co., Newark, N. J.

Handling the Charge Account

THAT credit is a mighty force in modern business requires but little proof in view of its use by dealers, wholesalers and manufacturers the world over. That,

basis, resulting in a much larger volume of sales, therefore, more profit even though he may suffer a few losses through bad accounts.

For illustration, let us say that through a strictly cash system the merchant does an annual business of \$75,000 upon which

on \$75,000 and four per cent on \$150,000.

In view of these facts, the retail automobile merchant may do well to encourage credit business. This may be a bold system, yet, nevertheless, true.

Value of a Credit System.

But the purpose of this article is not to discuss the advantages or the disadvantages of the credit business, but, rather to place before the auto dealer and the garage man methods whereby he can conduct his business upon a more profitable basis and speed up collections. As all have to do business on a credit basis, the information presented should be a decided value.

There is but one right way to do a thing, and there is but one right way to install a proper credit system and that is to start right at the bottom and build up. Therefore, the very first thing for the dealer to do is to see that every article of stock is provided with a price ticket, upon which can be entered the name of the article, the manufacturers, the cost, the selling price, to whom sold and by whom sold. These tickets should be in the form of shipping tags and should be placed on every article of size, such as machines, tires, jacks, tools, etc. For smaller articles, such as spark plugs, piston rings, etc., a small sticker may be used.

In the repair and garage department, a shipping tag ruled and printed in such a manner as to accommodate the entering of the name of the car, the name of the owner, the name of the workman, the date the car was brought in and the day repaired. The reverse side of this tag should be so ruled as to allow the entering of the labor, material, etc., used in making the repair.

Sales slips should be provided upon

Make of Car:	Owner:	Date:	Nature of Repair:	Date Promised:	Workman:	Date Repaired:	License No:	Age:	Model:	Tag No:	Remarks:
"Front"											
"Back"											
Hours	Rate	Workman	Supplies	Amt	Totals						

as a matter of fact, it is an indispensable element in our present day commerce cannot be denied. Fully 90 per cent. of the business of this country is carried on by credit. Its application to the retail business is almost universal. And, while the credit business has some disadvantages, the real advantages of the credit business out-weigh the disadvantages two to one in favor of credit.

RETAIL credit has come into disrepute because of the fact that it has not been adequately controlled. Business men have been too easy in the extending of credit. They have extended credit without the necessary facts upon which they could intelligently base the advisability of credit; in other words, they have extended credit in many cases where they would not for one moment think of extending a minor loan. They have been too lax in their methods of keeping books and entirely too lax in their collecting methods.

Credit, when handled through the proper system, is a mighty business builder. Credit, as a usual thing, appeals to the better class of trade than the cash method. Credit binds the customer closer to the house extending him credit, and also brings the customer back with a greater degree of regularity.

Credit enables the merchant to extend his business dealings to a greater extent than he could through the strictly cash

he realizes a new profit of five per cent, or a total of \$3750. Now, if that same merchant, by doing business on a credit basis, can increase his business from \$75,000 to a volume of \$150,000 yearly, and by using a proper system of extending credit and a systematic method of collecting his accounts, his loss should never be as high as one per cent, and this percentage would be high under a proper system—he would still have a

"Sales Slip"					Date	19__
Name:					Ticket No	
Address:					Employee	
Tires & Tubes	Grease	Spark Plugs	Batteries	Miscellaneous	Garage Rent	

"Sales Slip"				Date	19__
Name:				Ticket No	
Address:				Employee	
Gasoline	Gear Oil	Valve Oil	Heavy Oil		

gain of \$2250 in new profits, or the difference between five per cent net profit on \$75,000 and four per cent new profit

which the employee making a sale or repair may enter the date, the name and address and the article or articles, etc.,

which are to be charged to the customer. Three separate sales slips should be provided, one for the purpose of recording all sales of supplies, one for sales of gasoline and oils, and one for recording re-

the ledger sheet, he will file the original sales slip behind the guide card in this index drawer bearing this customer's name. Whenever a new account is opened, a guide card bearing the new

counts. There are a great many systems of keeping accounts sold commercially, any of which is good, but for the auto dealer and the garage man I would recommend a loose leaf ledger system.

The ledger should be an extension post type, allowing the insertion or removal of accounts without the necessity of a new ledger. Ledger sheets should be 11 by 11 inches, and so ruled as to accommodate the entering of the date of each charge, along with a description of the sale and the amount of the charge; also columns for entering the credit and balances.

Every ledger account should be kept in duplicate by providing a plain ledger sheet of the same size as the ruled sheet to be placed directly following the main ledger sheet of each account, so that by placing a sheet of carbon paper between the two sheets a duplicate of each account may be made.

By doing this the original ledger sheet may be used as monthly statements, thereby saving a great deal of time in getting out bills, and this will also insure an itemized statement for each customer. The duplicate will be retained as a permanent record in the ledger until the account is settled.

The Utility of Controlling Sheets.

There should also be a controlling sheet for each account. These controlling sheets should be placed in the front of the ledger and an index of them kept, facilitating the finding of the various accounts. The pages for this controlling sheet should be of the same size as the ledger page, but of a little heavier material, as they last for a considerable length of time, and if not of heavier weight will soon become worn.

These sheets should be ruled in the same manner as the ledger sheets with the exception that they will not bear the name of the business, but will be ruled to within an inch of the top, leaving sufficient space to enter the name of the

<i>"Labor Ticket"</i>			Date	19__	
Name.			Car	TICKET No.	
Address.					
Hours	Kind of Labor	Workman.	Rate	Amt.	
— Foreman —					

pair work and garage rent. (Two of these tickets are herewith illustrated.)

Sales Slips as Reference.

When an employee sells supplies or gasoline and oils, or makes a repair on a car, he should fill out the proper sales slip and turn it into the office, together with the price tickets detached from the article sold if tagged. The bookkeeper will enter the charges on his ledger from the sales slips and then the sales slips and the price tickets should be filed for reference should occasion arise for their examination.

For the purpose of keeping these sales slips and price tickets on file for immediate reference, an index file system should be provided for each one. Both files should be four by six inches, as both the sales slips and the price tickets are this size. The index drawer for filing the price tickets should be equipped with guide cards running "A to Z" and should have a capacity of at least 1250 cards.

Additional drawers may be added as the business demands. As the price tickets come into the office, the bookkeeper will file them in this index drawer behind the correct guide card. For instance, if the salesman sells an automobile to Oliver Summers he will detach the price tickets from the car and enter upon it the name of Mr. Summers and his own name and, together with the sales slip, he will send both to the office and the bookkeeper will file the price ticket behind the guide "S" in the index drawer.

Now, should it become necessary to refer to the price ticket for the purpose of determining some fact, all that is necessary is to open the index drawers and behind the guide card "S" will be found the original price ticket as it was taken off the car the day it was sold.

How to File Sale Slips.

The index drawer for filing the sales slips should be equipped with plain guide cards with one cut. The one cut style has a tab extending a little above the body of the card, upon which may be entered the name of the customer behind which the sales slips of that customer are filed.

As soon as the bookkeeper has transferred the charge from the sales slip to

customer's name may be added. The cards should be filed alphabetically, and more drawers may be added as the business demands.

With this system all sales can be traced back to the employees making them in case of any dispute. A customer may come in after receiving his monthly statement and state that there must be some error—that he did not buy an article specified in his statement on that date—that there must be some mistake in transferring the charge. All the bookkeeper needs to do is to refer to the sales slip index drawer and to locate the original sales slip and, if necessary, he may tell from it the man making the sale and prove the correctness of the charge through him.

The advantages of having the price tickets and sales slips on file for reference are many and a great many disputes will be settled without difficulty and ill feelings.

<i>"Price Ticket"</i>	
Article:	
Description:	
Manufacturer:	
Cost:	
Sell:	
Sold To	
Sold By:	
Remarks:	
Date Sold:	

The Ledger Accounts.

The next thing will be to provide a suitable ledger in which to keep the ac-

customer and the account number.

At the close of the month when the statements are mailed the bookkeeper

resources the merchant must find out, either from direct questions as to his position, his income and property, etc., or through tact and diplomacy, and draw from the applicant all the information he wants so tactfully that the applicant is unaware of giving it. Which is the best plan each dealer must decide for himself.

A card index file should be provided for the information cards after they have been filed and credit given. The merchant should set a credit limit and enter

this figure upon his information cards and file for reference. Space at the bottom of each card should be provided for remarks. For instance, a man may purchase an automobile of you on time, the cost amounting to \$1350, and he lives up to your terms to the very letter then you will enter this information on your credit card so that should the occasion arise for further credit you can refer to your previous dealings with this man.

In all cases where the amount of the credit is large, as when selling an automobile, or a lot of tires to a sub-dealer, the merchant should always demand a note, a bankable note, with or without interest as the merchant may see fit, until after maturity. If sold upon the plan that the purchase price is to be paid by three equal installments, then he should make out three separate notes, each maturing at a given time. If bankable notes are not secured, in the case of the sale of a machine, then he should require a note together with a mortgage on the machine until the purchase price has been paid.

For the convenient filing of contracts and mortgages the dealer will do well to provide "Document File Cabinets," equipped with "A to Z" guides and the contracts and mortgages may be filed alphabetically therein.

Collections Must Be Systematic.

But the matter of extending credit and promptly collecting the accounts when due are two different things. The real work of the credit dealer is not so much in opening accounts, although that is very important, as they have a direct bearing upon the collections, as keeping in close touch with the accounts and making prompt collections. In collecting the credit dealer must again have tact and discretion and good knowledge of his customers and their affairs to avoid offending them.

If the merchant will lay down certain credit rules and see to it that every customer understands them, and that every customer lives up to them, half his troubles collecting his accounts will be obviated. Every customer should have a copy of the merchant's credit rules, and for this purpose the dealer should have these rules printed and a copy enclosed with each statement mailed. Statements

for all accounts should be mailed the evening of the last day of the month and all accounts should be due and payable by the 10th of the following month. All accounts not paid by that date should bear interest at the rate of seven per cent.

The merchant should always bear in mind that prompt collections has a tendency to increase uniform attention. A

ever after that, for once legal action is taken it is a bad policy for a merchant to open another account with such a customer, not only because he has proven him self untrustworthy and unprofitable, but also because a customer once sued by a house is usually itching to put that house in the hole the first opportunity. Therefore, the merchant should first make up his mind that it is to his inter-

<i>"Information Card"</i>		
<i>Name:</i>		<i>Address:</i>
<i>Occupation:</i>		<i>Business-Address:</i>
<i>Approximate Income:</i>		<i>Own Property:</i>
<i>Kind of Property:</i>		
<i>Married:</i>	<i>No. of Children</i>	<i>Age:</i>
<i>With whom dealing:</i>		<i>Standing:</i>
<i>References:</i>	<i>Name:</i>	<i>Address:</i>
<i>1st.</i>		
<i>2nd</i>		
<i>3rd.</i>		
<i>Remarks:</i>		
<i>Credit Limit:</i>		

customer whose account is overdue, especially if it is large, may transfer his patronage to another place because he is in fear of being refused further credit and he does not wish to increase his liability.

Often a customer can be induced to give the merchant bankable paper in settlement for an overdue account where he is financially unable to raise the money, and in such cases acceptance of this is advisable.

Care in Invoking Law.

When an account reaches the stage where it is apparent that the customer is attempting to avoid the payment of it, and it becomes a question of getting payment in the quickest and surest way, legal steps should be taken. However, the merchant must first make up his mind that this customer is lost to him

est to close the account in this manner before taking such steps.

Customers can be trained to become prompt in settling their obligations as well as they can be trained to become dilatory, and once the merchant has impressed upon his customers that prompt settlement is necessary for further credit he will have little trouble with charge accounts.

The average customer is honest and when he opens an account with the merchant his intention is to pay, but circumstances may come that make it a little inconvenient for him to settle and if the merchant is a little lax in his demands for settlement the customer may allow the obligation to drag along until finally it is beyond his ability to pay and then he endeavors to avoid its payment.

THREE THOUSAND CARS IN YUGOSLAVIA.

WASHINGTON, June 14.—There are about 3000 motor vehicles in Yugoslavia, including a small number of trucks, says Consul Patton, Belgrade, in a report to the rubber division of the Department of Commerce. Ninety per cent. of the passenger cars use millimeter clincher tires, seven per cent. inch clinchers, and three per cent. straight sides. Cord tires have only made their appearance during the past year and are slowly gaining favor. Only two or three per cent. of the cars are now using them. American, French, Italian, German and Australian tires are offered for sale. Two American makes and the German Continental dominate the market, though Pirelli sells well in Dalmatia. Continental tires enjoy a good reputation now as they were well known

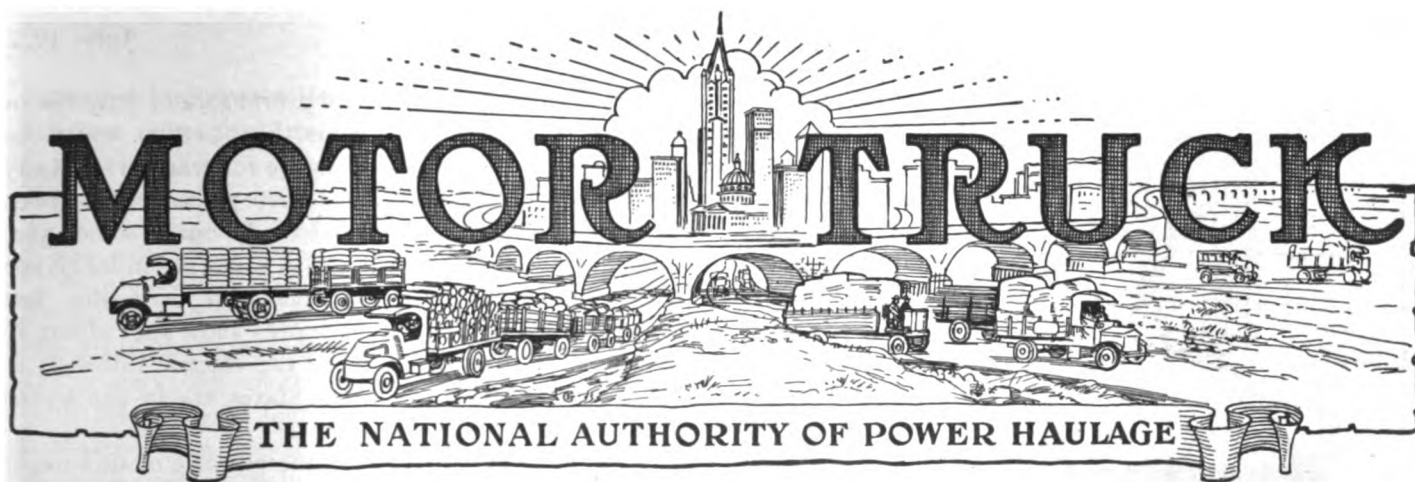
before the war, though two American makes are coming into general use as a direct result of the energetic selling methods of their agents and because of their quality. American tires are considered to be at least as good, if not better, while recently they have become as low in price as their competitors.

European manufacturers are inclined to ship their tires on consignment to their own factory representatives, or general agents, either for the whole country or for a given district. American exporters ship, as a rule, to general agents in Belgrade or Zagreb. Until recently the American shipments were made cash against documents at New York, but now a certain amount of credit is offered.

The rough roads of the country make

the consumption of tires per car about double that in the United States. A local dealer places the number of tires bought per car annually at from six to eight.

Red inner tubes are much preferred to the gray. There is no prejudice against American made tires and tubes, with one possible exception. Only about 10 per cent. of the motor trucks use pneumatic tires, the remainder being equipped with solids. The impression is growing among truck owners that pneumatic tires enable them to travel faster and results in less gasoline consumption. However, there has been no distinct switch from solid to pneumatic tires and it is not probable that any will occur until the roads become better, a condition that may obtain at some distant date.



VOL. XIII. NO. 7.

PAWTUCKET, R. I.

JULY, 1922.

Principles of Motor Bus Design and Operation

Pertinent Facts in Connection with the Business of Transporting Passengers by Motor Coach That Will Interest Every One in the Automotive Industry.

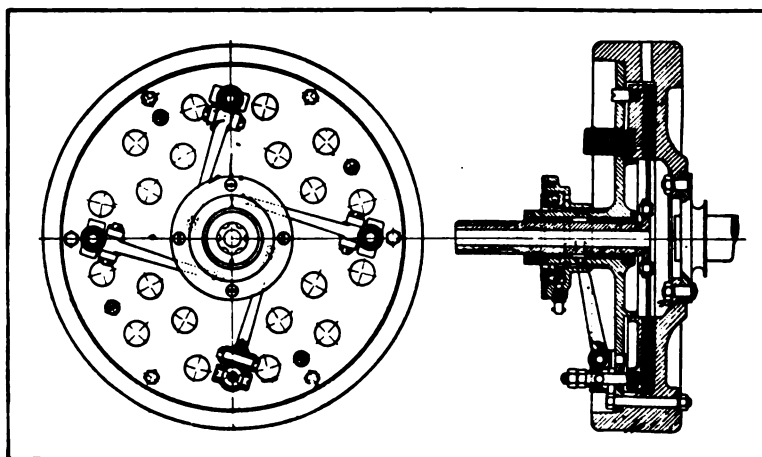
(By G. A. GREEN.*)

THE questions that builders and intending operators are asking today are, what constitutes a bus? And in what respects does a bus differ from other classes of automotive equipment? There seems to be a general agreement that a properly designed bus has special requirements; that it differs materially from equipment such as trucks and automobiles.

I have been requested to give the Fifth Avenue Coach Company's views on this subject. It is, of course, possible to deal with only the broader phases. No attempt will be made to discuss detail design, but merely to establish the principles on which it is thought such design should be based. We believe that with problems of this character, it is principles that really count, that once having clearly established them, the rest is comparatively easy. Actually, there is no real mystery in motor bus design. It is purely an engineering problem.

IN THE preparation of this paper the underlying thought has been to treat the subject in an impersonal manner. Illustrations and specific reference have been made to our practises only when this has appeared to be the simplest and most direct method of approach.

We believe this question is of paramount importance, not only to the automotive industry, but to all



Phantom View of Section Through the Clutch Used on the Types J and L Buses of the Fifth Avenue Coach Company.

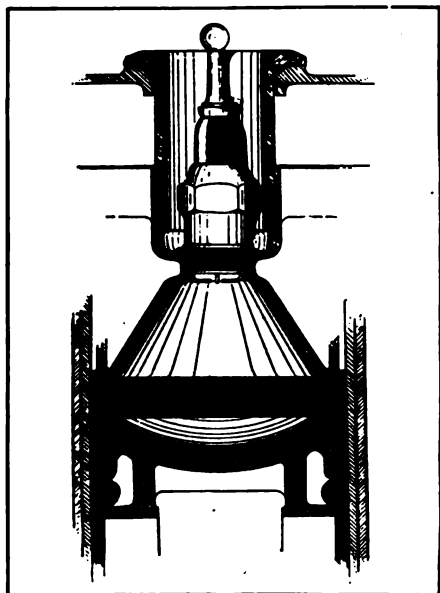
who are contemplating bus operation in any form. Our policy is predicated on a seat for every passenger. At the inception of our business this was our slogan. We

have never departed from it and we never expect to do so. We are convinced that this policy has been, perhaps more than anything else a factor in the building up of our enterprise.

It is, of course, possible to carry a certain percentage of standees in a vehicle, the spring suspension of which has been correctly designed to carry properly a seated load. In our judgment, however, this figure should not exceed 30 per cent. But even this is unsatisfactory, for once standees are permitted their limita-

*M. S. A. E.—General manager and engineer, Fifth Avenue Coach Company, New York City.

Extracts from a paper presented at the semi-annual meeting, June 20-24, 1922, of the Society of Automotive Engineers.



Elevation Through Combustion Chamber.

tion is most difficult.

Obviously the problems requiring solution from the standpoint of spring-suspension are much less numerous with vehicles operating on rails than is the case with rubber-tired equipment running over roads. With the former, overloading has no immediate serious consequences—at least from the standpoint of the rolling stock. The spring-suspension with a bus must of necessity be a compromise between minimum and maximum loads. If the range is too wide, bad riding conditions must obtain during by far the greater percentage of the total time, for the packed loads will, generally speaking, occur only during the rush periods. This means that 9 per cent. of the time there will be a state of discomfort. This will have an extremely bad effect on both the vehicle and its occupants. Another vital point to consider is that a bus is not kept in a comparatively straight and rigid course by steel rails. The advantageous flexibility of a bus in steering its course at will has its disadvantages if standees are permitted, for the shifting of the weight of the standees when the bus swerves tends to make it unsafe, throwing the passengers about inside the vehicle and rendering the operator liable to heavy damage and accident suits.

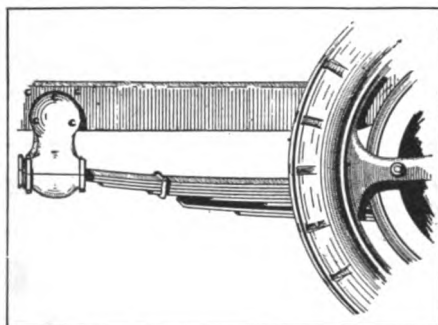
We are positive that the short road is the seated load and if build-

ers will bear this in mind from the standpoint of design and warranty, the automotive industry will assuredly find ample repayment.

We earnestly hope that the automotive industry will read the writing that is so plain to see and that it will profit by what has occurred with the street railways, in regard to the matter of overloading. For it must be remembered that the bus has its limitations and that it is not the cure-all for every ill that transportation is heir to.

The Matter of Fares.

Strictly speaking, there is no actual relationship between the design of a bus and the fares charged to passengers. Obviously, however, the better the design, the lower will be the operating cost. Naturally, this will make for lower fares. We believe that in the present state of the art no real success can be attained with less than a 10-cent fare. We are, of course, assuming operation based on seated loads and ample service during both the light and the heavy hours. But with character service, properly designed and maintained equipment, the people are quite willing to pay a 10-cent fare. There is ample evidence of this in



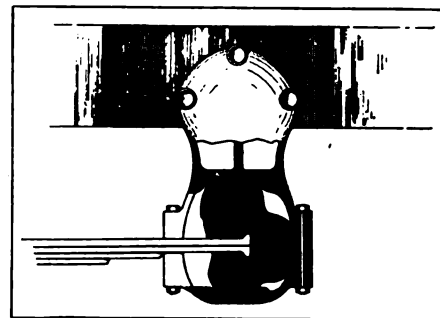
Type J Progressive Spring Arrangement.

New York City, Detroit, Chicago, Toronto and other cities.

The necessity for a 10-cent fare does not rest with only the bus. Many electric railways need a 10-cent fare in order to be put on a paying basis. The last available tabulation shows that 140 electric railways in the United States are receiving a 10-cent fare and that over 95 per cent. of the electric railways in the cities of the United States have received varying increases in fare during the last few years. Some

cities have a first fare of only six or seven cents, but to this must be added a charge for transfers. Many cities have been placed on the zone system that works out in some cases as high as 3½ cents per mile. Even with an increased fare the last available figures show that about 10 per cent. of the electric railways in the United States are in the hands of receivers.

It is not the purpose of this paper to enter into a lengthy discussion of operating costs, for unless this matter is treated in considerable detail,



Spring Suspension Has Rubber Shackles.

accurate deductions are almost impossible. Obviously, a correct comparison of operating expenditures can be made only on the assumption that similar detail classifications are employed in conjunction with a similar accounting system. Here the difficulties begin, for as yet few companies operating buses use the same accounting methods.

No doubt there are many who, while not desirous of making a minute survey of details of operating costs, would be interested in knowing something about this rather complicated matter other than mere expressions of opinion. For this reason there is shown in table one not the customary detail cost statement, but what might be described as an income analysis. Actually it represents a distribution of the dime as received from each of those who rode on our buses during the year 1921.

Table 1—Distribution of Each Fare Received.

	Cents
Total operating expenses..	6.77
Total taxes	0.86
Reserved for injury and damage claims.....	0.08

Reserved for depreciation.	0.60
Interest on capital investment	0.55
Net income	1.44
Total.....	10.00

From these figures it is abundantly clear that we should have made a very bad showing with a fare of less than 10 cents. Here is emphasized very clearly the fact that the success or failure from the standpoint of an undertaking such as our own depends absolutely on

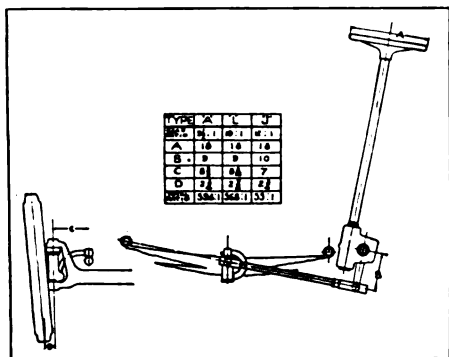


Diagram of Steering Leverage Lines.

the addition or subtraction of what at first sight appear to be insignificant amounts. To emphasize this point, during 1921 we carried a total of 52,216,946 passengers, so the net income from this source at 1.44 cents per passenger works out at \$751,924.02. To permit of a comparison being made between the conditions confronting us and those faced by others, it should be noted that we operate a total of 25 miles of one-way route, that our longest run is 10.2 miles and our average haul 5.0 miles.

Controlling Design Factors.

In its broadest sense we believe the controlling design factors from the standpoint of the motorists, in the order of their importance, are:

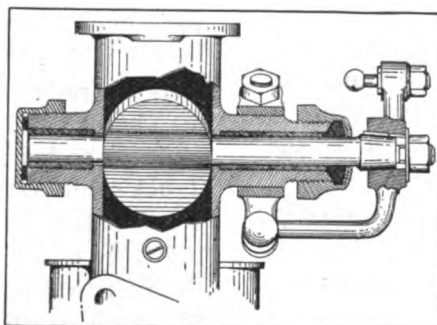
(1) **Safety**, (2) **comfort and convenience of the public**, (3) **minimum operating cost**.

Safety easily heads the list and a very large proportion of the engineering development work must be concentrated under this heading. It is generally agreed that a truck carrying freight should be in all respects safe, and that every reasonable precaution should be taken to

render automobiles transporting from one to seven passengers safe; so how much more important is it that a vehicle carrying 50 or more passengers should be free from every sort of hazard! It must be remembered that much of the mileage of the bus is through congested thoroughfares. This is not the case with the average automobile or truck. Again, the average individual makes some effort to get out of the way of a truck or automobile, but the bus, with its acknowledged flexibility, is supposed to move out of the paths of both vehicles and pedestrians.

The design of a motorbus from a safety standpoint includes certain basic features which must be incorporated in the general constructional plan. There are also other detail features which must be included. The latter are dictated by human considerations. Reference is now being made to providing the driver with reasonable comfort and convenience so that no undue hardship will be inflicted upon him as a result of the performance of his duties. First, let us consider the former. These are:

(1) **Low center of gravity**, (2) **wide frame, track and spring centers**



Sectional View of Carburetor Throttle.

and general dimensions, (3) **effective brakes**, (4) **short turning radius**.

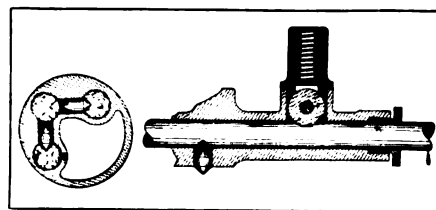
Low Center of Gravity.

Beyond doubt the future bus will be low hung. The inherent danger in connection with any other form of construction is the possibility of overturning. Under conditions of proper operation the hazard may be non-existent, but we have always before us the possibility of human failure.

In many cities there are overhead

wires and various other obstructions. The low bus is often a necessity to pass under such obstructions.

We have found that a practical height of the frame from the ground for a single-deck bus is 25 inches and for double-deck bus 18 inches. The center of gravity of our type L



Locking Mechanism Used on Shift Rod.

double-deck vehicles, with a full complement of passengers on both decks is 52 inches from the ground. With our type J single-deck bus this dimension is 38 inches. It is interesting to note that when rounding corners, even at a high rate of speed, skidding will occur due to centrifugal force, yet overturning is scarcely possible. Furthermore, rolling or sidesway is practically eliminated. With type L it will be seen that the frame and rear axle construction is somewhat unconventional. The rear axle is of the internal gear type. The spiral bevel gear and differential assembly is in unit form and can be entirely assembled and adjusted on the bench. The carrying member is a heat treated forged job.

Wide Frame, Track and Spring Centers.

These features are necessary to provide for adequate vehicular stability and, in conjunction with a low center of gravity, make for maximum safety. The necessity of providing proper stability applies equally to single and double-deck vehicles. It may be said that the added risk due to the top-deck load with the latter is more than equaled by the faster speed of the single-deck unit.

Apart from the matter of safety I believe that a wide frame is necessary in connection with the body construction. Obviously it is desirable to support the body as far out as possible, for in all cases the seating arrangement is such that the passengers are grouped about the

(Continued on Page 398.)

PERTINENT POINTED

TRUCKS MAY CARRY MAILES.

POSTMASTER GENERAL WORK doesn't intend for one solitary minute to let the shop-men's strike interfere in any way with the transportation of the U. S. mails.

In a recent letter to President Harding he has shown that there are available in the event of an emergency more than 50,000 motor trucks, counting those now in use by the department and others that may be obtained from various branches of government service, all of which can be mobilized within 24 hours from the time the call goes forth for them.

In addition to this there are many thousands more under the jurisdiction of the War Department that may be commandeered and additional numbers also running into the thousands that may be placed at the disposal of the postmaster general which are now being used by the various national guard units throughout the United States.

Plans for distributing mail by these motor trucks, regardless of what may happen, are all made and could be put into faultless execution on short notice.

This sounds like business.

As yet there has been no marked attempt to interfere with the running of trains, although as this issue of Motor Truck goes to press there is in certain quarters a belief (not shared by the writer) that sympathetic strikes by various trades allied with the shop-men's union may be called in the near future.

The important fact to the layman in the present crisis is that the postmaster general is onto his job. He hasn't taken the chance that the strike will not become general, but rather has worked on the theory that it may have far reaching effects and has laid his plans accordingly so that even though all rail transportation fails the mails will be handled virtually without delay.

Another fact, and one just as important to the country at large as it is to the automotive industry, is that the government authorities in the present emergency have in a matter-of-fact way—unconsciously one might say—turned to the motor truck as the natural solution of what otherwise might become a difficult problem. The

motor truck will make good in the emergency, too, just as it has at other times.

The railroad no longer is in control of the situation. It has a worthy competitor.

The fact of the matter is that in a few years the motor truck, (already a most important figure in the transportation system of the country, will be doing much of the work that is now being done by the railroad. It has proven its worth for short hauls in a manner that admits of no argument—with the building of proper highways its efficiency will become well nigh limitless.

Meanwhile, should occasion demand its use in the present emergency its cause will have been furthered to a marked extent.

NAILING THE LIE.

CONSTANT reiteration of an alleged fact soon establishes its authenticity among a certain class of persons who let others do their thinking for them. This truth is known to many, among others, the numberless propaganda writers for the electric railway lines. One of the pet verbal weapons of this clan in their war on the motor bus has been the statement that the trolley is decidedly safer than the bus because it runs on rails; therefore is less liable to collision.

There is an old gentleman in North Foxboro, Mass., who believes differently, however. Motor Truck's editorial representative saw this man on a recent trip which was taken to gather data for the story of a bus line that successfully operates through that section of the country, an account of which starts on page 373 of this issue of Motor Truck.

The aged farmer—he is more than 90 years old—shared a seat with the reporter and the two were soon in conversation. The editorial man, interested to know how the patrons liked the buses, finally brought the conversation around to the subject of passenger transportation and asked the native what he thought of the bus system. His answer was decisive.

"Buses are the best method of gettin' from one place to another we've had up here," he said definitely. "I use 'em a lot goin' to the village. Just as I used to use the trolleys."

COMMENT OF THE DAY

"But are they as safe as the electric car, do you think," asked the inquisitive reporter. "Wouldn't it be better if they ran on rails? The buses have to turn out for every bit of traffic that comes along just like any other conveyance that runs without tracks, while the trolleys never have to.

"No, they never have to," said the old man. "But that ain't sayin' anything in their favor. When the two electric cars come together a few years ago down here to Washington corners and smashed up more 'n half the load, it would 'a' been a mighty fine thing if they could 'a' turned out for each other."

Thus was the axe laid at the roots of the propagandists' pet paragraph.

This true story would be a good one to spread. Tell it to your friends and ask them to pass it along. It's worth the telling.

BUMPER INSURANCE.

NO OPERATOR of a passenger car or light truck can afford to be without a bumper. And yet how many machines does one see thus equipped. The proportion is small. Are bumpers hard to sell? It would seem that they shouldn't be and it is just as apparent that the market for them is only limited by the number of motor vehicles in use.

To me they seem as essential as tires, gasoline, or oil.

This is the reason why; a short time ago, desiring to have the valves of my car ground and not having time to do the job myself, I left the machine in a small repair shop that in times past has done good work for me. The proprietor of the shop and his single assistant both were busy and as I did not especially need the car for a day or so I was asked to leave it in the shop overnight with the promise that the work would be done early the next day.

About 10 the following morning I received a telephone call from the proprietor of the shop, who asked me if I could spare the time to come over for a moment. I asked if the car was ready and was told that it wasn't, but that he wanted to see me on another matter. Somewhat mystified as to what he could want I went over to his

place of business and soon found the reason why he had wanted to see me.

The radiator of my car was crushed in as effectively as though a battering ram had struck it.

"How'd this happen?" I asked the owner of the shop.

"I let a New York machine stay here overnight," he answered, "and I guess he must 'a' plugged you when he backed in. I didn't notice it until he'd gone; if I had I'd 'a' got his number and you could 'a' sent him a bill. I'm sorry it happened," he finished.

"I suppose you're responsible for the damage," I said.

For reply he pointed to a sign the text of which in effect stated that all cars were left in the garage strictly at the owner's risk. "I'll probably lose your trade," he said, "an' if it was a small job I'd be glad to make good on it, but it'll cost about \$60 and I don't feel as though it was up to me to pay for it."

"Probably it isn't," I said, "not legally at any rate, so don't worry about it. I'm mostly at fault for not having a bumper on the car. I planned to put one on several months ago, but never got to it."

This experience cost the company with which my car was insured something over \$60 for a new radiator. And the minute the repair was made I saw to it that additional insurance was placed on the car in the form of two husky bumpers, one at the front and the other at the rear.

These two bumpers cost me in the neighborhood of \$30 and according to my experience were cheap at the price asked.

To my way of thinking, and I have given the matter much thought, every car and truck should be equipped with a bumper.

Some owners are wealthy enough to pay the repairer's charges on new radiators, springs, etc., that may be necessary through serious collision, and for this reason may be able to get along without a bumper, but no man is so wealthy that he can afford to lose the use of his car or truck while repairs are being made and for this reason, if for no other, should buy a pair of bumpers at once.

For my part I'd as soon think of running my car without tires as I would without bumpers.

Automotive Developments Abroad

ASERVICE of some 35 motor taxicabs has recently been installed in Florence by veterans of the war under the name of the Associazione, Reduci di Guerra, says Consul Dorsey, Florence, in a report to the Automotive Division of the Department of Commerce.

The cars are of Italian manufacture, of the landaulet type and operated by four cylinder monobloc 20 horsepower engines. The associa-

tion expects to put 15 additional cabs in service in the near future. The tariff is 1.5 lire for 300 meters of nine minutes wait.

Although most of the roads in China are unsuitable for the use of motor cars, motorcycles can be used and greater numbers could be sold if properly presented, says Consul General Heintzleman, Hankow, in a letter recently forwarded to a trade publication interested in the line.

ONE of the most optimistic indications of improved conditions in Brazil is the completion of a branch plant of one of America's well known cars at Sao Paulo, says Consul Lawton, Sao Paulo, reporting to the Automotive Division of the Department of Commerce.

Brazil—Conditions Improving and Sales Increasing in Brazil.

Consul Cameron, Pernambuco, reports that 50 American trucks have been delivered up to date for use on the Coras Contra As Seccas (irrigation project), recently contracted to American and British firms in northeastern Brazil. A trailer was furnished with each truck. The "Assistencia Publica" (public hospital service) of Rio de Janeiro has just placed an order for six chassis with the Lancia Automobile Company. These chassis will be used in completing six fully equipped ambulances, the bodies of which will be manufactured locally, says Consul General Gaulin, Rio de Janeiro.

Potentialities of Peru.

It is estimated that there are but 2000 potential purchasers of automobiles in Peru at the present time, in addition to the 3000 present owners, says Acting Commercial Attache Dunn, at Lima, in a report to the Automotive Division. However, these will not purchase new cars until financial conditions improve. The market will be limited to replacements for the next two or three years, which will number not more than 300 cars per year. The constant changing of hands of cars already in Peru seriously affects the market for new cars, although it

gives a good market for parts.

Portugal—Revival of Trade in Portugal.

One of the largest importers of American goods in Lisbon recently stated to Consul General Hollois that he had sold 25 medium priced American cars at good prices during the past few weeks. This importer had not been able to sell any American cars for the past year. The limited market for trucks and accessories in Portugal is being solicited by trained salesmen from various European countries who speak Portuguese and offer ample credits and prompt deliveries in addition to low prices. Under these conditions it is doubtful if an important market exists for high priced American trucks until financial conditions improve.

Signs of Improvement in Syria.

The automotive market in Syria is improving, as is evidenced by the news received by the Automotive Division of the Department of Commerce that an agent for a low priced American car recently disposed of 15 cars in one day after receiving a

shipment of 30.

American Cars Predominate in Greece.

Sixty-five per cent. of the 2500 passenger cars in Greece are of American make, the remainder being principally French, Italian, German and British, Consul General Lowrie reports to the Automotive Division of the Department of Commerce. In addition to the passenger cars there are 400 trucks and 200 busses in use at the present time, 60 per cent. of which are of American make, the remainder being principally Italian, British and French in fairly equal numbers.

About 6% of the trucks and busses in use were secured from war material at Saloniki.

Great Britain's Imports of Motor Vehicles Increasing.

Official monthly returns for the first quarter of 1922 indicate that British imports of passenger cars, trucks and chassis are again on the increase. The total number of passenger cars and trucks imported during this period was 2495, valued at £461,328, and chassis numbered 2370, valued at £479,009. During the corresponding quarter of 1921 the total number of passenger cars and trucks imported amounted to 2914, valued at £661,156, but imported chassis numbered only 963, valued at £314,863. Canada ranked first in regard to number of finished cars furnished and fourth with respect to chassis. France ranked second with regard to both finished cars and chassis. Italy was third for finished cars and first for chassis, while the United States was fourth in finished cars and chassis of various kinds.

REDUCES ACCIDENTS.

MOTOR vehicle accident injuries have been reduced in Massachusetts from 21,086 in 1920 to 11,487 in 1921, a decline of 45 per cent. The total of accidents and fatalities will be still further lowered in 1922 if the rate for the first five months is maintained. The revocation of 4899 licenses during 1921 has had a stimulating effect on careful driving.

REPUBLIC KNIGHT MOTORED BUS

THE Republic Knight Motored Bus, used in San Francisco last month to convey the reception committee and officials who had charge of the national convention of the Mystic Shrine, is shown above.

This is the same type of Republic bus that has been adopted by the leading street railway companies to handle their supplementary and feeder service through territories where trackage does not exist. These buses have met with very notable success, especially in Baltimore, Md., where a fleet of 26 is now in daily service on the principal car routes of the city. They are also being used in Boston, New Haven, Providence, Newark, Youngstown, San Diego and at



Economy of Operation Is a Feature of This New Republic Knight Motored Bus.

other points where they are in test operation unusually fine reports having been received of them.

They are called economical by

those who have operated them, while many passengers have mentioned their unusually easy riding qualities.

GREAT SYSTEM OF HIGHWAYS PLANNED

A system of highways that will serve the whole country and will be far superior to any other in the world is being mapped out by Federal and state engineers. It is estimated that the system will comprise 180,000 miles of road. The Federal highway act recently enacted specifically requires that all Federal aid be spent on a connected system of highways consisting of not more than seven per cent. of the road mileage in each state, and that this system shall consist of interstate or primary roads and inter-county or secondary roads.

Proposed systems have been received by the Bureau of Public Roads of the United States Department of Agriculture from all but eight states. They are plotted on a large map of the United States and carefully examined as to coordination with the roads of adjacent states and service to all sections of the country. Where coordination is not satisfactory conferences are held with all interested state highway officials and routes adjusted.

Many states have already adjusted difficult problems with their neighbors. As an example the system sent in by Nebraska showed a big gap in an important road along

the northern boundary. It was learned, however, that South Dakota would follow with a system that would fit like pictures on toy blocks. Since the Federal highway act of last November became a law only roads certain to be on the system have been approved for construction.

Lower Prices for Highway Materials Reported.

A considerably lower level of prices for the various items entering into highway construction is reported by the Bureau of Public

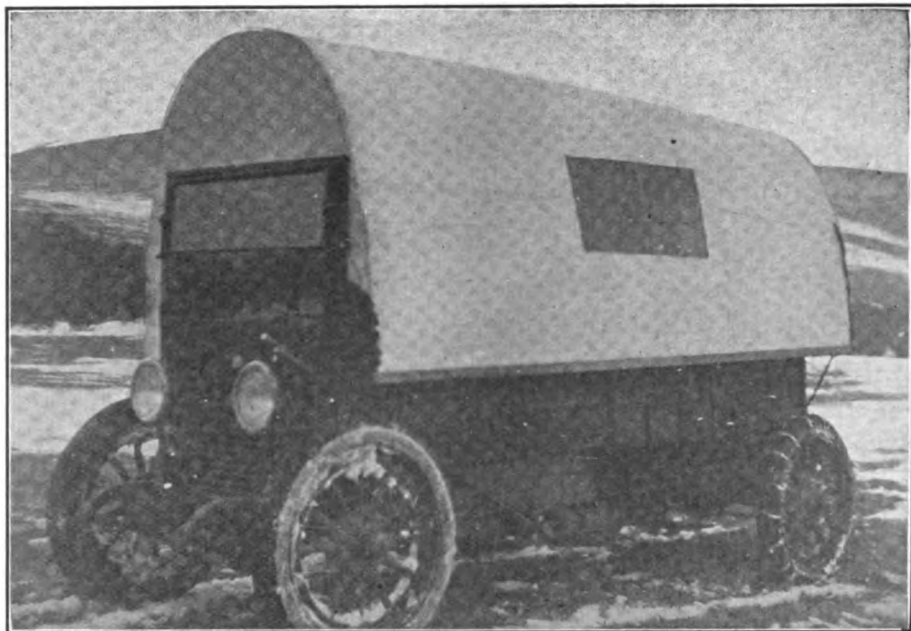
Roads of the United States Department of Agriculture. This conclusion is based on the following prices by successful bidders on Federal aid roads during April and are averaged for the whole of the United States. The figures cover a large volume of work well distributed over the country, while others are based on small volumes or scattering reports.

The figures which cover the cost in place are as follows: Earth excavation, common, 33 cents a cubic yard; rock excavation, \$1.26 a cubic yard; gravel, \$1.44 a cubic yard; sand clay, 45 cents a cubic yard; crushed stone, \$3.42 a cubic yard; structural concrete of various classes ranges from \$14 to \$21.20 a cubic yard. For surfacing the following are the prices by the square yard: Gravel, 40 cents; surface treated macadam, 50 cents; bituminous macadam, \$1.06; bituminous concrete, \$1.97; plain cement concrete, \$2.17; reinforced cement concrete, \$2.54; and brick, \$3.70. Reinforcing steel has cost \$0.053 a pound and structural steel \$0.059 a pound. Cement has been furnished to contractors by the following states at the prices given by the barrel: New York, \$1.73; Wisconsin, \$1.94; and Arkansas, \$2.70.

FLORISTS USE TRUCKS.

THE motor truck has become a great value and assistance to the concerns that make up the New York City flower market. This direct means of transportation from the nurseries to the city markets afforded by the truck saves much valuable time. The factor of time is especially important in the shipment of delicate cut flowers which must be handled with greatest care and protected from the changes of temperature.

A MODERN PRAIRIE SCHOONER



This Rugged Old Car Has Carried More Than 44 Children at Once.

WHEN Daniel Boone was tramping the forests of Kentucky he carried with him a rifle, which gave him faithful service all the years of his life. He gave this weapon the affectionate name of "Old Betsy" and this name has ever since been a symbol of faithful service.

Out on the boundless plains near Laramie, Wyo., there are scattered numerous ranch houses, the children in which need the education offered by the modern schools located in the busy town. There was a certain problem in collecting these children, but it has been solved by another "Old Betsy."

The proposition of getting combined capacity and warmth was solved by constructing a body like that of a sheep wagon on the sturdy Buick. To make the car roomy the body was extended over the engine. Large sheets of celluloid, protected by a closely woven wire netting, permitted the driver to see out at both sides and at the rear. A slatted floor above the engine permits the heat from the motor to enter the car and directly over the engine are seats for eight children, so arranged that the children when seated do not obscure the driver's view of the surrounding country.

Old Betsy has carried as many as 44 children to and from school, but this is only a part of her duty. In a rugged district like the Wyoming plains there are occasional outdoor accidents. Many an injured cowboy or sick rancher has been carried into the Laramie hospital as comfortably as if he had been in the most modern ambulance.

Rescue work is only a part of the day's job for Old Betsy. She has saved many lives.

BOSCH MAGNETO FOR FORDSON

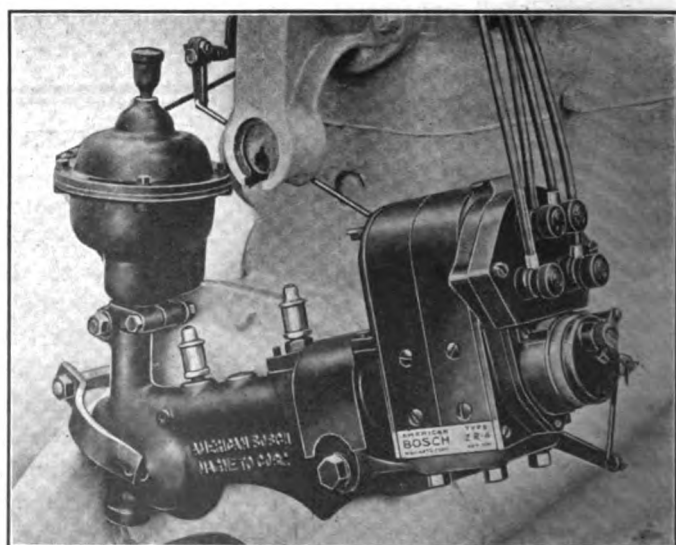
IN RESPONSE to a very insistent demand among Fordson owners for Bosch magneto ignition, the American Bosch Magneto Corporation has just brought out a new fitting which enables any Fordson owner to readily equip his engine with a Bosch magneto. It has also brought out a Bosch governor which can be mounted directly on the magneto fitting, being driven by the cam shaft gear, which is the same gear used for the magneto.

The new Bosch magneto fitting for Fordsons can be supplied with, or without, the Bosch governor, and with either the ZR or DU type of Bosch magneto. It fastens onto the front part of the Fordson engine, it being easy to make the installation as the radiator does not have to be removed and there is no special machine work or complicated fitting to be done. It is only necessary to re-

move the Fordson ignition system and to take out two bolts in the gear housing. The Bosch magneto fit-

tion the Bosch attachment is extremely simple. There is a drive shaft extending from the engine cam

Fordson Owners
Now May
Have Bosch
Magne'to
Ignition on
Their Tractors.



ting can then be bolted to the front of the engine and the installation quickly completed.

As can be seen from the illustra-

tion the Bosch attachment is extremely simple. There is a drive shaft extending from the engine cam shaft to magneto, and one set of spiral gears. The bracket is a heavy malleable iron casting containing bronze bearings and engine oilers.

The Highway Problem

(By B. B. BACHMAN,* President, Society of Automotive Engineers, Inc.)

IT APPEARS to me to be particularly unfortunate that there should be any controversy between the railroads and the users and manufacturers of motor vehicles, instead of complete harmony and cooperation. Except in the most isolated cases, competition between these two forms of transportation is most unlikely. I think this is almost universally true with regard to transportation of goods; and in the transportation of passengers it is almost equally true if we stretch our imagination to embrace what must be the development of the future. I recognize the fact that there is a large amount of capital invested in street railway transportation, but I am also impressed more and more daily with the fact that the streets of our cities are becoming less able to accommodate the burden of traffic which they are called upon to bear. It seems to me not at all improbable that this condition will make it imperative in the not very distant future to replace track vehicles with a more flexible form of vehicle for short hauls and where frequent stops are necessary.

THIS problem of highway capacity as evidenced by our city streets deserves the most careful study on the part of every automotive engineer, particularly as to what its probable effect will be on future design requirements as affecting the size of the vehicle, the control with respect to steering, turning radius, acceleration and braking. In many of our cities very stringent regulations with regard to parking have been put into force. It is useless to spend our time in railing against these provisions, for in some measure at least they represent the legitimate effort to distribute the use of the streets in a

fair way among all citizens. The problem presented is of the most complex nature and deserves careful study and analysis.

Another result of the increasing traffic density is the lowering of the efficiency of motor vehicles as a means of saving time. As the cost of operation of motor vehicles has been reduced, and the possibility of use thereby increased, this new factor of limitation of speed, due to congestion, becomes increasingly important.

In the broader aspect of transportation in rural and suburban communities there should be practically no question of conflict between the railway and the motor vehicle. We have in this country a sufficiently

close-up picture of the development of transportation facilities to be able to get a very comprehensive and intelligent view of the relation between various means of transportation and the establishment and development of communities.

The early settlements were along the seaboard and the more navigable streams, and this condition of affairs continued up to the time of the development of the railway, which resulted in the unlocking of the vast inland empire and the linking up of the Pacific coast with the Atlantic, which would have been practically impossible without this new means of transportation. The development of electricity and its application to high speed interurban

*Chief Engineer, Autocar Company, Ardmore, Pa.

THE WAY THEY BUY THEM IN THE WEST



This Fleet of International Harvester Trucks, Lined up to Have a Picture Taken Is on Its Way to Western Dealers. Every One of the Trucks Seen Has Been Ordered and by the Time These Lines Are Read Will Have Been Delivered.

lines was the next step in bringing high speed transportation into closer contact with the small community and individual. It is obvious, however, that the operation of rail lines calls for a virtual monopoly of territory in the form of a franchise and limits the operation of vehicles over any given track to one centralized authority and calls for fixed schedules of operation.

The advent of the automobile has resulted in placing into the hands of the individual a smaller and more flexible unit with practically the equivalent speed capacity of the railway. This vehicle, capable of being operated over the road, can be made more truly competitive and infinitely more flexible and independent of fixed schedules. The growing use of the automobile and the truck, coincident with the development of and as an auxiliary to the railway system, has resulted in extensive suburban and rural development which would probably have been as impossible without the automobile as the development of the inland cities of this country would have been without the railroad.

While this development has resulted, and the increase in realty value is recognized and acknowledged, the increasing traffic, particularly over main routes, will bring a reaction unless we are peculiarly alert to study and suppress in design all objectionable characteristics of our vehicles to the greatest possible degree. I appreciate that the control of all these features is not in the hands of the engineer or manufacturer, but he should be thoroughly posted as to what they are and be prepared to cooperate intelligently with regulatory bodies to assure that rational measures for the protection of the public are enforced which do not impose unreasonable restriction on road transportation.

Much of the discussion on the question as to who should bear the burden of the cost of construction and maintenance of our highway systems, or whether the motor vehicle operator is receiving a public

subsidy which is not shared by the railroad, etc., appears to be beside the point. The cost of transportation of passengers and freight, by railroad, water or highway, is borne by the whole community and shared by every citizen in proportion to his requirements for transportation. I believe this to be so, whether the cost of transportation is included in the cost of the commodity or it appears partially in the form of taxes. The big fundamental problem is to determine the economic field for each medium of transportation and

the relation each should bear to the other for maximum efficiency, and the most satisfactory means of proportioning the expense to the individual.

U. S. ALLOTS \$2,464,299 FOR ROADS IN NEW YORK.

Motorists throughout the East have become enthused over the report that the Federal government has appropriated about \$100,000,000 for good roads. The Federal appropriations will be granted to states making an appropriation for good road expenditure equal to the Federal allotment.

3,000,000 Motor Vehicles on Farms

2,850,000 Motor Cars—150,000 Motor Trucks.

Division and State	Motor Cars	Motor Trucks	Division and State	Motor Cars	Motor Trucks
Geographic Divisions:			East South Central:		
New England...	44,754	8,119	Kentucky	30,146	1,538
Middle Atlantic...	164,939	22,011	Tennessee	23,550	1,430
E. North Central...	550,858	26,074	Alabama	16,592	1,180
W. North Central...	693,182	33,375	Mississippi	15,853	1,005
South Atlantic...	200,103	15,787	West South Central:		
E. South Central...	86,141	5,153	Arkansas	16,408	1,027
W. South Central...	184,275	9,455	Louisiana	10,512	874
Mountain	98,727	7,589	Oklahoma	52,063	2,155
Pacific	123,533	11,606	Texas	105,292	5,399
New England:			Mountain:		
Maine	12,569	1,120	Montana	22,072	1,225
New Hampshire...	5,283	717	Idaho	17,646	837
Vermont	8,172	616	Wyoming	6,705	591
Massachusetts ..	9,309	3,535	Colorado	30,830	3,016
Rhode Island...	1,395	536	New Mexico...	6,018	593
Connecticut	8,046	1,595	Arizona	5,082	581
Middle Atlantic:			Utah	8,657	572
New York	74,753	9,259	Nevada	1,717	174
New Jersey	13,695	3,380	Pacific:		
Pennsylvania ...	76,491	9,372	Washington ...	29,792	3,371
East North Central:			Oregon	22,223	1,819
Ohio	128,384	7,319	California	71,518	6,416
Indiana	102,122	3,671	Total U. S.		
Illinois	139,090	6,154		2,146,512	139,169
Michigan	82,437	4,886	States Having Most Cars on Farms.		
Wisconsin	98,825	4,044			
West North Central:			State	No. of Cars on Farms	
Minnesota	107,824	3,803	Iowa	177,558	
Iowa	177,558	8,910	Illinois	139,090	
Missouri	86,229	5,059	Ohio	128,384	
North Dakota...	47,711	774	Kansas	111,055	
South Dakota...	58,352	4,353	Minnesota	107,824	
Nebraska	104,453	6,548	States Having Most Trucks on Farms.		
Kansas	111,055	3,928			
South Atlantic:			State	No Trucks on Farms	
Delaware	4,014	304	Pennsylvania	9,372	
Maryland	17,702	2,805	New York	9,259	
Dist. of Columbia	58	29	Iowa	8,910	
Virginia	30,959	2,544	Ohio	7,319	
West Virginia...	11,127	936	Nebraska	6,548	
North Carolina...	44,207	2,671			
South Carolina...	32,812	1,736			
Georgia	49,841	3,145			
Florida	9,383	1,617			

(NOTE—The above tabulations from the U. S. Department of Agriculture are as of Jan. 1, 1920, and total 2,146,512 motor cars and 139,169 trucks. Registration of motor vehicles in the United States has increased 38% since Jan. 1, 1920. This increase applied to the farm figures brings the farm total 3,177,000, indicating that the 3,000,000 figure is today a conservative total for rural registration.)

New Bus Line for Rochester

OPERATING eastward out of Rochester, traveling the exclusive East avenue, where no street cars are permitted, four De Luxe Selden motor busses are now in operation. Undoubtedly among the finest motor busses operated in this section of the country they are meeting with the approval of all patrons. They do not have the appearance of

trucks, but are like great touring cars—low hung, easy riding, unusually well painted, silent running and easily controlled. Already they have secured quite a patronage among East avenue residents and members of the two golf clubs on the route, as well as residents of this territory between Rochester and Pittsford and visitors at Maplewood Inn Park.

THE rates charged are governed by three zones. Eastward, the first zone, including Rochester limits and Brighton, is 15 cents; the other two zones add five cents each, making 25 cents to Pittsford, eight miles out.

The bus bodies were built by Kuhlman Co., Cleveland, and are mounted on Selden unit No. 52. Each bus will comfortably seat 29 passengers with plenty of standing room if needed. They are equipped with semi-pneumatic tires and cushion wheels, giving the same easy riding quality as pneumatics, with no trouble from punctures and less expense per tire mile.

The chassis is designed to give the maximum of safety and comfort and the minimum of maintenance and operation costs. It is the low hung type, full flexible and with the frame "kicked up," over the rear axle to obtain the minimum height from the ground.

The motor is a special four-cyl-

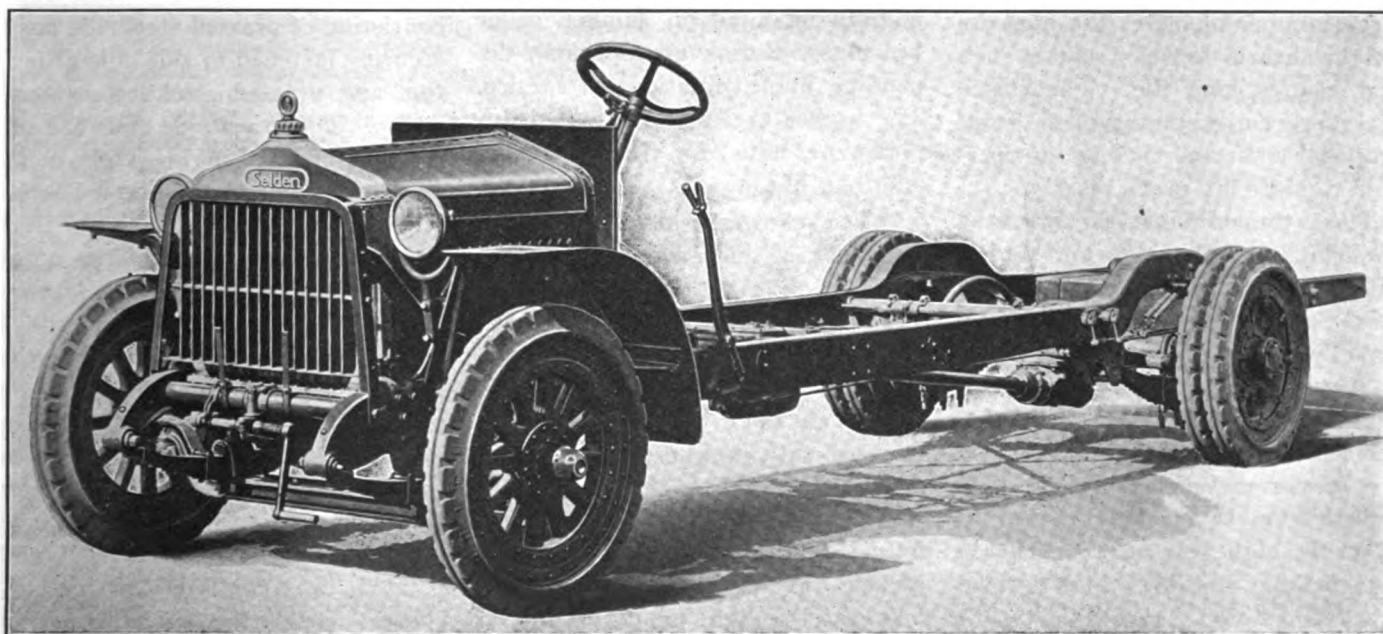
inder heavy duty type. The rear axle is the inverted worm drive with several optional gear ratios, depending upon operating conditions. The steering gear is the worm and wheel type mounted on the left side. Duplex type brakes are used.

Entrance is by one door at the forward right hand side, controlled by the driver, who also collects fares. An electrically operated emergency door is installed at the rear end of the left side. Two short steps lead into the interior from the street. The busses are electrically heated and the lights are sufficiently powerful to permit easy reading of news print.

The East Avenue Bus Company, Incorporated, was organized by Rochester men, who saw the need of better transportation facilities between Rochester and the East avenue section. The city is rapidly building in that direction and some of the finest and most successful sub-divisions are located in that ter-

ritory. Brighton is practically part of Rochester, but Pittsford is situated eight miles out on the main road to New York and all points East. The service is needed and undoubtedly the East avenue bus line will have an almost immediate growth.

The chassis used is of the low hung type. The frame is the exclusive Selden shock absorbing flexible construction. The side rails are of the constant stress type of design, the depth of the frame section varying to suit the load carried. The rails are "kicked up" over the rear axle to obtain the minimum height from the ground. They are narrow in front to allow maximum steering lock of the front wheels to give short turning radius and extremely wide in rear to give proper support to body. All units are flexibly mounted in chassis. It is impossible to throw any strains on them due to frame weaving on account of irregularities in the road surface.



This Low Hung Selden Bus Chassis Has a Flexible, Shock Absorbing Frame and Constant Stress Side Rails.



Beauty Is Expressed in Every Line of This Selden De Luxe Bus Body.

The motor is a four-cylinder heavy duty type. The cylinders are cast in pairs, requiring minimum of effort to remove one in overhauling. The motor is lubricated by force feed, oil being forced to all wearing parts by a large gear oil pump at bottom of crank case. Cooling is assisted by extremely large water jackets and centrifugal pump. The actual brake horsepower is 48 at 1400 revolutions per minute.

The Eisemann high-tension water proof magneto is used and the Stromberg $1\frac{1}{4}$ -inch carburetor.

The clutch is of the multiple disc—dry plate type—in unit with motor and fully enclosed. As the clutch does not run in oil it is not affected by atmospheric changes. It engages gradually but positively without “grabbing.” Due to the large number of plates the pressure on the disc is low per square inch and insures long life. The clutch brake prevents spinning of the front propeller shaft and enables the operator to shift his gears readily.

The transmission is mounted amidships as a separate unit and is of the selective sliding gear type, four speeds forward and one reverse, with direct drive on high. It is mounted on the Timken roller bearing. The gears are all of $3\frac{1}{2}$ per cent. nickel steel and the shafts are of chrome nickel steel. The transmission is specially geared to offset the high gear ratio in the rear axle, making possible a high surface speed on high, exceptional hill climbing ability and power to pull

through bad roads on low.

A universal drive with two sets of metal universal joints and tubular shafts are used, one between the clutch and transmission, the other between the transmission and rear axle. The metal joints are used to insure long life and dependable service.

Front axles are standard equipment. These are Elliott type drop forged I beam sections of high carbon steel. This is given triple heat treatment to prevent breakage. The knuckles and steering arms are of chrome nickel steel of very liberal proportions in order to insure safety.

The rear axle is of the inverted silent worm drive semi-floating type. Years of experience have proven that this axle is the most suitable for motor bus operation. This axle is fully mounted on Timken roller bearings. Ratios are optional, depending upon conditions of service. The brakes are of the patented duplex type, noted for their efficiency and long life.

Wheels are cast metal, with hollow spokes, guaranteed for life of vehicle.

The left hand drive is used with the brake lever attached directly to the left frame side. It is in a position where the driver will not be interfered with in emergency. Being attached to the frame it will not throw strains on the more delicate units. The gear shift lever is attached directly to the clutch unit, being at the right hand side of the driver. Spark and throttle controls

are under the steering wheel with an accelerator pedal on the floor board to the right of the brake pedal.

The modern tendency in the development of any vehicle for public transportation, particularly when any large number of people are to be carried at one time, is to give first consideration to the factor of safety. For this reason steel is almost exclusively employed today in the construction of steam and electric railway rolling stock, and the traveling public has become generally familiar with the greater security existing in a steel constructed vehicle. The absence of danger from sharp, jagged pieces of splintered wood in collisions, and the protection afforded in case of fire have put steel constructed equipment in popular favor with both operating officials and public.

The body is mounted on side of chassis frame and is supported by suitable number of cantilever extensions attached to chassis frame. The upper or tension member of these extensions extend across the chassis frame.

All bodies are designed to allow a clearance above the top of chassis frame of 14 inches. Cover plates which may be readily removed when necessary are provided to enclose both wheel housings.

Floor is of $13/16$ inch rift sawed yellow pine with floor strips for drainage of surface moisture.

Side construction is of truss type, consisting of pressed steel side posts securely fastened to side sills at bottom and pressed steel letter board at top. The lower side and rear end are sheathed with light weight metal covering clamped to pressed steel window posts. All side posts have necessary cleats for attachment of “Renitent” post castings.

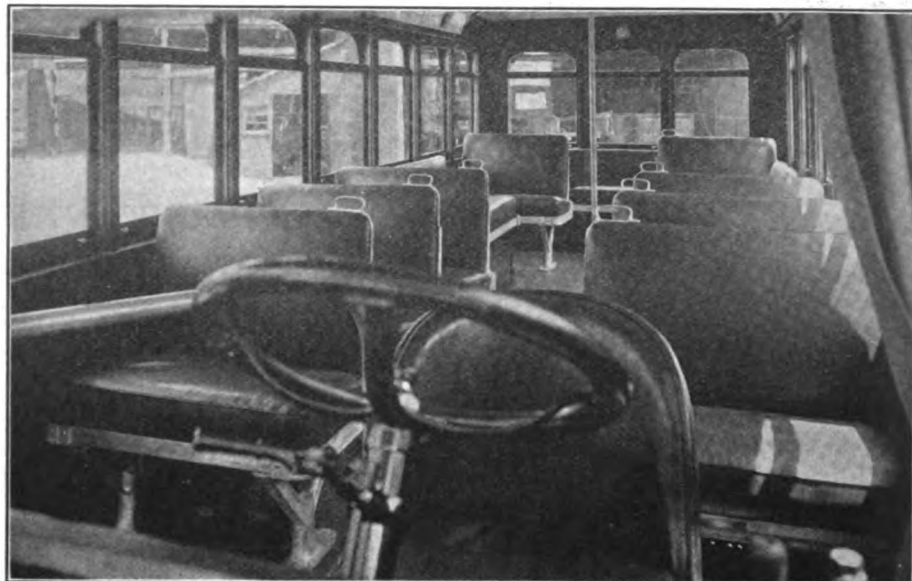
The roof of three-ply moulded veneer is securely fastened to the upper ends of letter panel and to pressed steel car lines by clamping process. All joints are filled with rubber compound, insuring water proof connections. A good grade muslin is stretched over roof and painted in color selected by purchaser. Inside the body the ceiling is finished in white enamel.

Three exhaust ventilators of minimum height are located along center line of roof. Ventilator openings in body are covered with metal grill.

A two-leaf manually operated service door which folds outwardly is located on the forward right hand side of the body. The two upper panels are glazed with 3/16 inch crystal glass and the two lower panels with wire plate glass to give the operator a better view of prospective passengers. The operation of this door is controlled by a hand lever convenient to the operator's left hand.

An emergency door is provided on left side at rear. The operation of this door is controlled by an electric lock with spring contacts under glass cover. The breaking of the glass automatically causes the lock to operate. It may also be released by a push button at operator's position.

Seat back frames are of wood, mortised and tenored; have venti-



Interior of the Bus Is a Highly Finished Job of Coach Building.

lated spring inserts and are upholstered with best grade of dark green imitation leather. Cushions have ventilated wire mesh base arranged to receive ventilated insert springs, and also upholstered in best grade of dark green imitation leather. Seat frames are of metal and each

cross seat back is equipped with suitable grab handle.

Operator's seat is of bucket type, with cushion and back spring upholstered and stuffed with best grade of curled hair and covered with same material as that which is used for the passengers' seats.

PLAN BIG MERGER

DAYTON, O., July 10.—Associated Motor Industries, the merger which has just been perfected by makers of seven different cars and trucks, has organized its central offices in this city and is pushing work rapidly ahead to get into full production. Nine manufacturing plants in seven states, with five assembling plants, 14 in all, are included in this first group of Associated Motor Industries, according to information received by the company.

Additional companies soon are to be taken into the merger, it is said.

Will I. Ohmer of Dayton, O., whose plant is one of the largest making ignition systems, is chairman of the board. In announcing that Mr. Ohmer will direct all operations of Associated Motor Industries the board of directors states that he is recognized as one of the foremost production experts of this country.

Associated Motor Industries will continue to produce the cars and trucks at present made by the member companies, including Jackson automobiles and Jackson Four Wheel Drive trucks, the Dixie Flyer auto, the Traffic trucks and the cars and trucks now made by the National Motor Car and Vehicle Corporation. The line thus includes a four, a light six, a de luxe six and a full line of trucks for all purposes.

Standardized, large quantity production will be put into effect. All the plants are fully equipped and capable of indefinite expansion in output. The dealers' financing plan of Associated Motor Industries is an innovation on the distributing end, relieving the dealer of the burden of financing himself and providing

an unprecedentedly liberal sales outlet for the corporation.

Following are the manufacturers included in the "first group" of Associated Motor Industries. Other manufacturers soon are to be taken in and their names are expected to be announced within a short time:

National Motor Car and Vehicle Corporation, Indianapolis, Ind., manufacturer of National cars and trucks; Covert Gear Company, Lockport, N. Y., manufacturer of all types of transmissions, clutches and controls for cars and trucks; Recording and Computing Machines Company, Dayton, O., manufacturer of ignition systems, magnetos, starters, battery systems and generators; Jackson Motors Corporation, Jackson, Mich., manufacturer of Jackson automobiles and of Four Wheel Drive trucks; Kentucky Wagon Manufacturing Company, Louisville, Ky., manufacturer Dixie Flyer automobile, trucks, automobile wheels and truck bodies; Saginaw Sheet Metal Works, Saginaw, Mich., manufacturer of all sheet metal parts for automobiles and trucks; Traffic Motor Truck Corporation, St. Louis, Mo., manufacturer of Traffic trucks; Murray-Tregurtha Corporation, Boston, Mass., manufacturer of gasoline engines; H. F. Holbrook Company, New York, N. Y., manufacturer of automobile bodies.

The officers of the corporation are announced as: President, Louis Ruthenburg; chairman of the board, Will I. Ohmer; vice presidents, A. A. Gloetzner, Robert V. Board, T. C. Brandle, George M. Dickson.

The board of directors is composed of Robert V. Board, president, Kentucky Wagon Manufacturing Company; A. A. Gloetzner, president, Covert Gear Company; James R. Duffin, president, Inter-Southern Life Insurance Company; Louis Ruthenburg, formerly general manager of Delco plant of General Motors Corporation; H. G. Stoddard, treasurer, Wyman-Gordon Company, Worcester, Mass.; H. V. Hale, general manager, Saginaw Sheet Metal Works; H. J. Linkert, treasurer, the Recording and Computing Machines Company; C. L. Halladay, vice president and general manager, Jackson Motors Corporation; W. W. Sterling, vice-president, Jackson Motors Corporation; C. L. V. Exselsen, vice president-treasurer, Roland A. Crandall & Company, bankers, Chicago, Ill.; Guy Wilson, president, Traffic Motor Truck Corporation; T. C. Brandle, vice president in charge of merchandising, Traffic Motor Truck Corporation; G. M. Dickson, president, National Motor Car and Vehicle Corporation; Buell Hollister, Pyne, Kendall & Hollister bankers, New York City; H. F. Holbrook, president, H. F. Holbrook, Incorporated; M. Douglas Flattery, chairman of board of Murray-Tregurtha Corporation.

The finance and advisory committee is as follows: Will I. Ohmer, Louis Ruthenburg, James R. Duffin, Carl L. V. Exselsen, R. C. Morse.

Executive committee, A. A. Gloetzner, Louis Ruthenburg, Robert V. Board, H. V. Hale, T. C. Brandle, G. M. Dickson, H. J. Linkert, C. L. Halladay, Will I. Ohmer.

LEGAL POINTS

By SAMUEL WANT

IN PRECEDING articles attention has been called to the rule of law that a person, who is injured in an automobile accident, will not be awarded damages upon mere proof of the accident and the resulting injuries in a suit against the motorist. The essential additional fact that must be proved is that the accident was due to the failure of the motorist or his chauffeur to use the degree of care that ordinarily prudent men would have exercised under similar conditions. If this fact is proved and it appears that the accident was due to such neglect, unmixed with concurrent neglect on the part of the injured person, the latter is entitled to damages. Not otherwise.

Very recent cases to which this principle has been applied are as follows:

In a Wisconsin case a car was overturned, causing the death of a passenger. There was no evidence from which it could be definitely ascertained how the accident occurred. It did appear that when the car was examined after the accident, the tire of the front wheel was deflated, and that just before the accident the car had been travelling at the rate of fifteen miles an hour. The court held that the accident might have resulted from the blowout of the tire, and that as there was no evidence pointing to negligence on the part of the driver, the owner of the car was not responsible in damages to the relatives of the decedent.

In a case decided in Iowa, a pedestrian on the sidewalk was struck by an automobile. There was no evidence to show the cause which led the driver to permit the car to get on the sidewalk. Under this peculiar state of facts, the court decided that proof of negligence was not necessary to justify the recovery of damages.

As there can be no justification for the presence of an automobile on a sidewalk except under a very extraordinary state of facts, the court ruled that mere proof of the fact stated was enough to create a legal inference of negligence against the motorist.

In an Ohio case, it appeared that a prospective purchaser was examining a car. While he was standing in front of it and the demonstrator was manipulating the parts for the information of the former, the car suddenly started forward, injuring the intending purchaser. There was no evidence to account for this unusual occurrence—that is to say, no evidence of negligence within the rule above stated.

But the court held that as this case too was an exception to the general rule. It applied the reasoning of the above mentioned Iowa case, and awarded damages for the injuries sustained by the prospective purchaser.

A RULING similar to those made in the last two cases was made in a recent Pennsylvania case. Here it appeared that a man and his wife hired a car together with a chauffeur. The chauffeur got out of the car during the trip for the purpose of visiting a nearby store. When he had gone a few feet the car started off and ran into a ditch. The occupants were injured and were awarded damages.

A RECENT Tennessee case holds that a county is not entitled to damages for injuries done to the public roads by reason of the unusual weight of loads carried on the trucks of a particular person. The rule would be otherwise, the court said, if the damage resulted from reckless driving or improper management of the trucks.

The above is the rule where there is no special act of Legislature. On this account the Legislatures in several states have passed special laws limiting the weight of loads and the size of trucks. Attention has been called to some of the legislation in preceding articles.

MANY decisions have settled the point that statutes regulating common carriers of freight and passengers apply only to automobiles which are offered for public hire. Also the transportation of passengers or freight by motor vehicle from a point in one state to a point in another is "interstate commerce" within the meaning of statutes of Congress governing such commerce. An apparent limitation on the principle of these decisions is to be found in a recent Federal case, which decides that it is not "interstate commerce" for a man to transport his own goods, in his own car, and for his own use (i.e., not for the purpose of sale) from one state to another. Hence the Federal statutes, which prohibit interstate commerce in certain articles, do not apply to the transportation of such articles by motor vehicle under the special circumstances indicated.

IN A recent decision of the Supreme Court of Tennessee, one of the counties of the state sought an injunction against a trucking company to prohibit it from drawing its ten ton truckloads over the roads of the county. The ground of the application was the fact that the roads had recently been macadamized and that when the work was done it was not in contemplation that loads of over 3000 pounds would have to be supported. For this reason, it was contended serious damage was being done to the county roads to the great loss of the taxpayers. The court held, however, that this position could not be sustained in view of

the unqualified right to use the public roads connecting the various counties of the state. Of course, if there were more than one road traversing the distance between the two points, it would be competent for the Legislature to require heavy loads to be carried over one of the other such ways, but, where only one road exists between two points, not even the Legislature has the power to prohibit ordinary traffic.

IN VIEW of a recent decision of the Supreme Court of Tennessee, it may be questioned whether the advantages accruing from the joint purchase of an automobile are not offset by the disadvantages incident to joint ownership. According to this decision, where a brother and sister own a car jointly, sharing all the expenses, including the salary of the chauffeur, the sister may be held liable for an accident due to the negligence of the chauffeur when he is driving the car from the garage to the brother's place of business to take the latter home.

THE rights of repairmen for labor and incidental supplies in connection with the repair of an automobile are emphasized in a recent decision of the Court of Appeals of Maryland. In this case it is held that the general rule of law to the effect that a repairman loses his lien where he parts with the car after completing his work upon it has no application to a case in which, upon the application of the owner, the repairman sends the car to an upholsterer to be measured for covers, the car being in charge of the repairman's helper and being promptly brought back to the garage after the measurements are made.

In the same case it is pointed out that the lien of the repairman is superior to the rights of the seller of the car under a conditional contract of sale held by the latter, under which title to the car is reserved by him.

IN A recent decision of the Supreme Court of Georgia an unsuccessful attempt was made to hold a bank liable for breach of warranties in the sale of a car under the following state of facts: The car was owned and sold by the cashier of the bank, who represented to the purchaser that the bank had an interest in it and had also loaned to the purchaser from the bank's funds the money with which to pay for the car. The cashier also made specific warranties as to the condition of the car and represented that the bank would be responsible for compliance with these warranties.

THE general principle of law that, where an agreement has been reduced to writing, the parties will not be permitted to offer oral proof of conditions in conflict with the terms of the written instrument was applied to a contract for the sale of an automobile in a decision just handed down by the Court of Appeals of Maryland. In this case, which was a suit by a dealer on a note given to cover the purchase price of a car, the maker of the note contended that he had an agreement with the dealer whereby he was to deliver to the latter, in settlement of the note, a certain used car and a stipulated amount in cash. His explanation of the note was that this was given simply to bind the transaction pending unavoidable delay in the delivery by him of the used car. As the agreement thus set up was verbal and contradicted, the unqualified written agreement to pay, which was evidenced by the note, the court held that this proof should not have been admitted and that the maker of the note was liable in accordance with its terms.

SOME of the dangers and risks incident to the towing of a car in the public streets are shown in a decision of the Pennsylvania Superior Court. From the facts of this case, it appears that a pedestrian waited on the curb of a street for a truck to pass and then proceeded across the street. He was tripped up by a sagging tow rope which connected the truck with another car, but which the pedestrian did not see. The accident occurred on a dark night and the distance between the truck and the car, which was being towed, was such that it would not have been imprudent or legally negligent to have attempted to pass between the two cars if both had been proceeding under their own power.

Without pointing out just what act of negligence on the part of the drivers of the cars could be held to be responsible for the accident, the court decided that a verdict in favor of the injured pedestrian should not be disturbed. The implication is that a light from either the rear of the truck or the front of the car which was being towed should have been played upon the tow rope so as to indicate its presence.

AUTOMOBILE accident policies contain a provision to the effect that, in the event of a claim being made against the motorist for an accident within the terms of the policy, the insurance company may take over the defense of the suit against the motorist. But, if the judgment rendered against the motorist is for more than the amount of the policy, the insurance company's liability is limited to the face of the policy and the motorist must pay the difference. In a New York case, where the policy was for five thousand dollars, a claim against the motorist for a large amount was defended by the insurance company. The suit resulted in a verdict for thirteen thousand dollars against the motorist. Upon the assurance of the company's attorney that an appeal would be taken, the motorist took no action for his protection. No appeal was, however, taken

within the required time, due to the negligence of the Company's attorney, and the motorist was compelled to pay the judgment. The company paid him the amount of the policy but refused to pay more, and suit was brought by the motorist against the insurance company for the difference. The court held that the insurance company could have defeated the claim if it could have shown to the satisfaction of the court that an appeal in the damage suit would not have resulted in a reversal of the verdict, but no proof of this was offered. A judgment was, therefore, awarded in favor of the motorist.

IN A case just decided in New York, an insurance Company refused to pay a motorist the amount which he had been compelled to pay for the death of a pedestrian, due to the negligent operating of his car. The company's defense was that at the time of the accident the car was being driven by a child of the motorist who was under the legal age, and it contended that its policy was not intended to protect a motorist who permits his car to be driven in violation of law. The court refused to accept this view of the situation and required the company to make good the loss.

A CIVIL suit for damages for the death of a sheriff recently decided by the United States Court of Appeals points out a novel application of the law of arrest as applied to automobiles.

The facts of this case show that a motorist, who was on a West Virginia road, was hailed by a sheriff who told him that he was under arrest by virtue of a warrant which the sheriff exhibited as the car approached. It appears that this occurrence was near the State line, and the motorist, instead of stopping and submitting to arrest, speeded up his car in an effort to get across the line. The sheriff jumped on the running board, and, in a tussle which ensued for control of the wheel was driven against the side of a bridge and the sheriff was killed.

In deciding that the motorist was liable in damages to the relatives of the sheriff, the court pointed out that when the sheriff mounted the running board of the car exhibiting his warrant, he had the legal custody of both the motorist and the car, so that the act of attempting to get across the line to render the arrest ineffective amounted to a resistance against a lawful arrest. On this ground the court decided it was immaterial whose specific act caused the car to strike the bridge, thus eliminating from the case the contention of the motorist that the sheriff caused the accident in attempting to get control of the car.

A FORM of hysteria, which manifested itself in an uncontrollable fear of automobiles is an element of injury for which the jury may make an allowance in assessing damages in an automobile accident, according to a recent decision of the Supreme Court of the State of Washington.

A RECENT decision of the United States District Court in Michigan is of especial interest to manufacturers who supply parts for the business of assembling cars and to tire makers.

In this case, one of the large tire companies had been supplying tires and rims to a company engaged in assembling automobile parts for a car of its own manufacture. The contract between the parties provided that the tires and rims should remain the property of the tire company even after being attached to cars, until paid for, and the purchaser agreed to maintain a special trust account for keeping separate that part of the price of all cars sold which represented the cost of tires and rims. The manufacturer being subsequently declared a bankrupt, a contest ensued between the tire company and the trustee of the bankrupt court for the tires and rims on hand.

The court held that under the broad provisions of the bankrupt law as now existing, the tire company could not recover the material.

The moral of this case is that the tire company should have recorded its agreement. This would have given it complete protection as against the creditors of the bankrupt. Upon the same principle, a motorist who sells his car on time should have a recorded bill of sale or chattel mortgage covering the unpaid balance of the purchase money; in no other way can protection be obtained against the claims of the general creditors.

PERSONS who are in the business of hiring cars are under a legal obligation to see that their drivers are thoroughly competent for the business in which they are engaged. In a recent Tennessee case it appears that a passenger in a hired car was injured as a result of the unfamiliarity of the driver with the control of the car and the particular locality in which he was driving. The owner of the car was held responsible, notwithstanding the fact that he proved that his driver was duly licensed and came to him well recommended.

STATUTES and decisions against price-fixing seem to have been successfully circumvented by at least one automobile manufacturer. This concern contracted with an agent to supply him with a given quantity of cars. He agreed to pay 85 per cent of the selling price of the cars upon his receipt of the same, and stipulated that he would sell the cars at a fixed price and give specified service to purchasers. The net result of the arrangement was that the so-called agent was really a retail dealer restricted as to his prices, and receiving a profit of 15 per cent on each sale made by him.

The agent attempted to get away from his contracts as to the selling price of the cars, contending that it violated the law against price-fixing. The court, however, regarding the form rather than the substance of the transaction, held that the contract was one of agency only and, that, therefore, the manufacturer could limit the price to the ultimate purchaser.

Newest Addition to Standard Line Is Speed Truck at \$1330

Model 75, Despite Low Price Will Embody Continental, Timken, Brown-Lipe, Eisemann and Stromberg Units in Its Construction—Has 134-Inch Wheelbase.

DETROIT, MICH., July 10.—A new light duty speed chassis is being manufactured by the Standard Motor Truck Company. This will be known as their model 75 and will meet the demand for a high grade, worm, light duty chassis that is on a par with the other Standard company's products.

This truck will contain the same line of standard units that are incorporated in the others. These units are: Continental engine, Timken bearings, Brown-Lipe clutch, Spicer joints, Eisemann magneto and Stromberg carburetor.

The Continental N 3½ by five-inch water pump engine furnishes the power, while the well known Brown-Lipe multiple disc clutch and unit power plant transmission conveys the power through a two-piece Spicer propeller shaft and universal joint assembly to the Timken worm drive rear end. The axle equipment consists of the Timken 1250 front and 6250 rear. A Ross steering gear completes the units. The truck is equipped with pneumatic cord tires 33 by five inches front and rear. Springs that are designed to assure ample resiliency and easy riding qualities are provided and are constructed of alloy steel. The all steel seat and riser, together with the regular Standard chassis equipment, including a vacuum tank installation, complete the chassis. The wheelbase is 134 inches.

WHITE SALES GROWING IN VOLUME.

CLEVELAND, O., July 5.—The White Motor Company truck sales for the second quarter of the year show an increase of 40 per cent. over the first quarter and 23 per cent. over the second quarter of

1921. The month of June was the best since September of 1920.

Orders continue to reflect the generally improved business conditions, the second quarter showing an increase of 26 per cent. over the first quarter and 37 per cent. over the corresponding quarter of last year. Cash on hand is \$2,500,000, with notes payable reduced to \$1,200,000 and no customers' paper discounted.

Inventories are now at a minimum and the production schedule is being gradually increased to meet current demands. By October it is expected production will be over 10,000 trucks per year.

In past years orders during the summer months showed a seasonal reduction, but so far this summer the volume of orders has been maintained and reports from the 40 branches throughout the country indicate that this year will not show the customary seasonal contraction.

NEW YORK MIRROR LAW WORKING OVERTIME.

NEW YORK, July 12.—It is decidedly noticeable that the great bulk of motor truck owners and operators are seemingly indifferent to the provisions of the so-called mirror law, which provides that all trucks shall be equipped with a mirror so located as to give the operator a view of the road to the rear of his vehicle.

When this law was enacted it was enforced and truck owners provided their vehicles with the necessary accessory. Lately, however, there seems to have been a decided indifference to this law and in many cases when it is observed it is done in a very perfunctory manner. This was called to the attention of a mo-

torist when the other day he was blinded by the sun rays reflected from a mirror directly into his eyes by the reflection from a mirror on an approaching truck. This particular truck was equipped with a mirror, but it was pointed ahead rather than behind, so that the only purpose it served was to reflect the rays of the sun in the opposite direction from that which it naturally was thrown.

Close observation of trucks has revealed many decided infractions of the regulations. A great many vehicles are not equipped in any way, shape or manner with mirrors and on still others mirrors are so placed that it is absolutely impossible for the operator to see anything of the road in back.

On some of these trucks where the bodies overlap the fender there is no special place for the mirror and in still others the mirrors are attached directly in front of the driver's seat so that all one gets is a reflection of the driver and the front part of the truck body. Many of the mirrors used have been found to be in very bad condition, the quicksilver having spread and so far as performing the function of a mirror are absolutely impossible.

While the truck driver seems lacking in the conservation of this particular statute the owners of passenger cars, which are not compelled by law to carry mirrors, are utilizing them to a greater degree than ever.

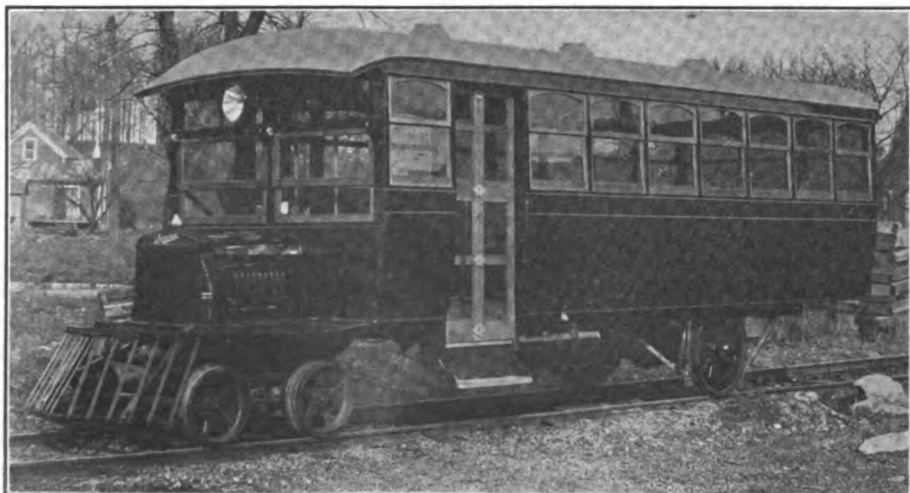
There are few closed cars lacking in this essential, while many open cars are also equipped with mirrors for the reason that the operator believes that they are an added factor of safety. When the passenger car owner or operator equips his vehicle with such an attachment it can be taken as pretty conclusive proof of its value and there is no doubt but that such equipment has often prevented accidents.

It is decidedly important that heavily loaded trucks, which seem to have a tendency to drive in the center of the road, should exercise greater care in observing this particular law.

MOTOR CARS INCREASE ON RAILROADS.

PEMBERTON, N. J., July 9.—The substitution of gasoline motor driven equipment for steam locomotives and coaches will save the Union Transportation Company of New Jersey nearly \$14,000 annually, it is stated. This equipment will be used by the company on its run from Hightstown, N. J., where it connects with the Amboy division of the Pennsylvania railroad, to Pemberton, the southern terminus.

It is also reported that the use of similar equipment by the Narragansett Pier railroad of Rhode Island has practically doubled the number of patrons on this line. Other railroads have installed this type of equipment it is stated with very good results. Some of the roads using it on some of their lines are New York, New Haven and Hartford, Great Northern, Cleveland, Cincinnati, Chicago and St. Louis, Baltimore and Ohio. In all there are about 35 roads using this kind of equipment.



The Service Rail Bus Has Helped Several Railroads to Lower Operating Costs.

New York Out to Stop Practise of Overloading Motor Trucks

Nearly 200 Arrests Made in Less Than Two Months for Violation of Excessive Weight Law—Others Taken in for Bad Tires and Lack of Mirrors.

NEW YORK, June 12.—Some instructive figures have just been compiled by Highway Commissioner Herbert S. Sisson, showing that the state campaign against the use of overloaded trucks on the highways is being carried out in an energetic manner. A bill enacted by the last Legislature placed much stricter regulations upon the proper loading of trucks than hitherto existed in New York state, and a careful watch is being kept on motor transport overloads.

From April 11 to June 10 the commissioner reports that 178 arrests have been made for overloading. In the same period 14 arrests were made for bad tires, one for excess width of body and several hundred for failing to equip trucks with mirrors giving a view of the road and traffic in the rear.

Divided by the overload on the rear axle in pounds the figures also show that the capacity which had the greatest percentage of overloads was of the five and 5½-ton capacity, the next principal offender being the seven and 7½-ton truck.

The first observation of trucks was in Westchester county. The inspectors with their loadometers were then transferred to Nassau county. About June 12 the Highway Department placed seven other inspectors equipped with weighing devices on the road, and there are now eight crews in different parts of the state stopping and weighing trucks. It is expected that a vigorous campaign of this character will be continued permanently until the very prevalent practise of overloading is stamped out, as it is bad both for the truck which carries the overload and the highway over which the truck operates.

The Motor Truck Association of this city, which is heartily supporting the

commissioner, in commenting on the arrests, says:

"It is against public policy that a small number of persons who constantly overload their trucks for the purpose of making greater profits per load should be allowed to continue to do so, and thereby make it impossible for the vast majority of law-abiding truck operators to carry the load allowed by the state, with a profit, in competition with those who constantly overload, as this is another form of price cutting.

"Commissioner Sisson is firm in his intention to reduce to the minimum this form of violation of the law, and in his action has the support of the community at large."

Recognizing the fact that the steady increase of motor trucks adds to the congestion of many of our highways and occasionally to the irritation of tourists in passenger cars, the National Automobile Chamber of Commerce, through its motor truck committee, has formulated a campaign to encourage courtesy on the part of truck drivers.

"Courtesy," it states, "is as cheap as the air you breath. Practise it on those with whom you come in contact on the highways. It pays! When you are aware that a faster moving vehicle is trying to pass move to the right at the first opportunity. Give the passing vehicle a cheerful greeting as it goes by."

Managers and owners of truck fleets are urged to impress the importance of careful driving and road courtesy upon the drivers. It is sensible action, as such conduct will go a great way toward removing much of the opprobrium with which motor trucks are frequently regarded by passenger users. Roads are public property and the passenger car driver should also be careful to observe

proper courtesy. In this respect many car operators could improve their motor road manners very commendably by displaying reasonable politeness in slowing up to allow pedestrians to pass at road intersections where they are no traffic officers.

In its suggestions for courteous observance by motor truck operators the National Automobile Chamber of Commerce advises that drivers be impressed with the necessity of permitting faster vehicles to pass them, with driving always at moderate speed, never taking chances, recognizing the rights of pedestrians and being especially careful about children playing in the streets and on the sidewalks. "Driver discourtesy," says the committee, "must not be tolerated, as it creates public opinion antagonistic to highway transport."

As an important part of the campaign the committee has prepared a pamphlet entitled "Common Sense on the Highway." Some of its suggestions are:

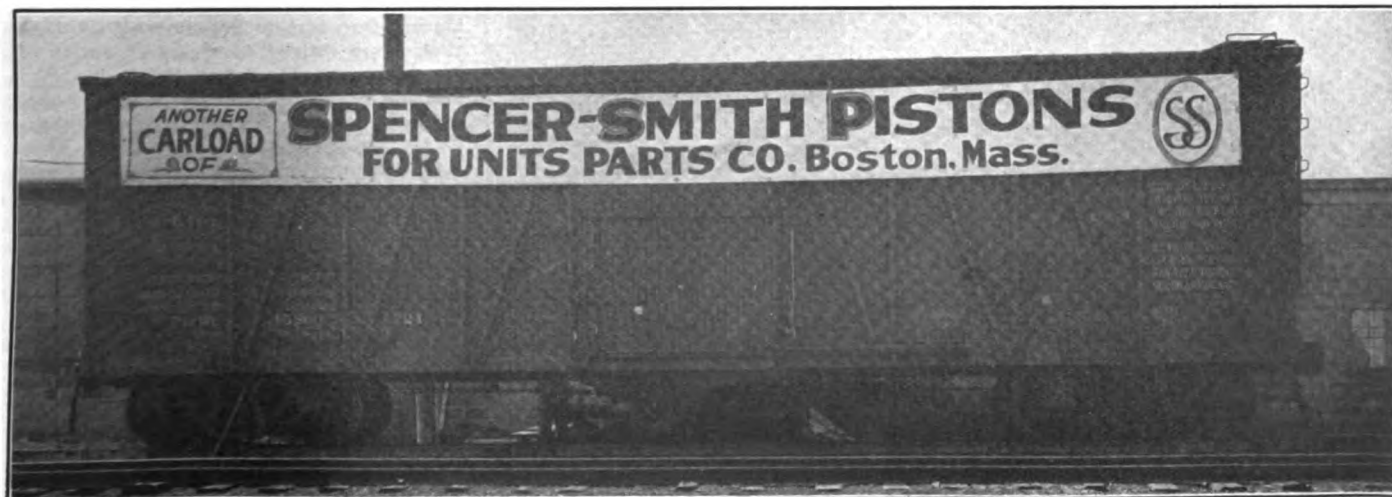
Cheerfully sharing the road with others makes friends. Blocking the road makes an unnecessary enemy. You can't afford to make enemies—they prove expensive.

You hear a horn—it may be a doctor on an errand of mercy—you would not willingly or knowingly take a life. But you may if you persist in holding to the center of the road. Let him pass—with a spirit of "godspeed."

It is railroad practise to haul a freighter off on the siding, to let the express go by. It is common sense. You are the freighter of the highway—the plugger, the worker, the money maker—a part of the nation's commercial system of transportation! Don't forget the express—give him a chance!

TRUCK CONTROL WANTED BY GEORGIA.

ATLANTA, GA., July 10.—An attempt is being made to have motor buses throughout this state put under the control of the Railroad Commission, by many of the short line railroads. H. H. Hill, secretary of these roads, which are 28 in number, explains that the regulation of the bus lines is sought in order to protect and safeguard the railroads from competition of a certain kind.



The Fact That One Dealer in One City Buys Pistons by the Car Load Gives One a Idea of the Immensity of the Industry.

Women's Clubs Told of Benefits Accruing from Highways

John C. Long and Pyke Johnson Speaking Before National Convention of
General Federation Emphasize Ways in Which
Roads Benefit Nation.

CHAUTAUGUA, N. Y., July 9.—Highways benefit the home! Highway accidents are preventable! These two themes were developed by Pyke Johnson and John C. Long of the National Automobile Chamber of Commerce, speaking before the biennial convention of the General Federation of Women's Clubs in session here recently.

Fresh food is made available for the city children, better schools and wider social opportunities are provided for the country boys and girls, through improved highways and motor transportation, Johnson pointed out.

Guarding of danger points, prosecution of the careless driver, ample play grounds and education in the schools will eliminate accidents, Long indicated.

"A great educator has said that education is nothing more than an interpretation to the child of the environment in which he lives," said Johnson, "and of this environment the highways today have become a most important part.

"It is the highway which brings the doctor to the door and it is over the highway that we go for most of the important events of our life.

"It is the condition of the highway which determines whether our children shall go to school every day during the school year or whether they shall have to stay at home to bother their mothers part of the time.

"It is the condition of the highway which determines whether the milk which is brought to our door in the morning is fresh and whether we shall receive it regularly.

"Without the highway our great national parks, the playgrounds of the nation, would be largely inaccessible.

"In fact, there is no phase of our daily life which has not been materially and

HAUL CATTLE AT OMAHA.

ALL former records of receipts of live stock by trucks for one day were broken recently at the Omaha, Neb., stock yards. The final count showed that 229 cattle, 46 calves, 2267 hogs and 710 sheep were brought into the yards in trucks.

seriously affected in some way by the roads which pass the door."

"If every woman in America would enroll for the degree of doctor of safety, the accident question would soon be solved," said Long. "The diagnosis is simple. Twenty-eight cities reduced their motor fatalities last year. Massachusetts cut down the number of traffic injuries 50 per cent.

"The four main accident symptoms and their remedies are these:

"1. Danger spots, such as curves, blind corners, busy intersections. Sufficient guarding by patrolmen or by signs is an immediate remedy, with improvement of the physical design of the danger spot as an ideal cure. That is, a sharp curve may be patrolled, but it should ultimately be straightened.

"2. Prosecuting the careless driver. Citizens complaint bureaus, like those in Detroit and Syracuse, are needed to facilitate complaint against and prosecution of the reckless minority who are making the entire community pay the price of their heedlessness.

"3. Playgrounds. The school department should be consulted as to whether there is enough play space and whether there are enough play instructors to justify telling the children not to play in the streets. Pending the building of more playgrounds, if needed, certain streets should be roped off as play areas.

"4. Education in the schools. Children are naturally irresponsible, but through traffic games, playlets and other instruction they can be trained habitually to conduct themselves properly in traffic."

INDIANA TRUCK TO HAVE NEW PRESIDENT.

MARION, IND., July 8.—At a special meeting of the board of directors of the Indiana Truck Corporation, J. W. Stephenson was elected president of the corporation. He had formerly served several years in the capacity of treasurer, later vice president and general manager. The late Mr. Barley and he owned a large amount of the stock in the company and had worked together in the developing and increasing the business of the concern.

In the course of a statement given for publication, Mr. Stephenson said: "In accepting this position as the head of the corporation, I am fully confident of a prosperous, successful future, the attainment of which must result directly, and in the same proportion, to our entire organization, managers, distributors and friends who supply us with material.

"No administration or organization can succeed to a high set standard for which we are working unless we all prosper, and to this end you may anticipate my personal interest and cooperation, as well as that of other members of the firm.

"Mr. Barley at all times had in mind the furtherance of the Indiana truck, and made provision in his will whereby his large interests in the company shall be held intact indefinitely, and no delays or complications shall arise in the conduct of the business.

"The policies of the company have always been to build good trucks, deal square and be courteous.

WEISS RETIRES AS GENERAL MANAGER OF HYATT.

DETROIT, MICH., July 7.—General Motors Corporation announces that J. G. Weiss has retired from active duties of general manager of the Hyatt bearings division on account of his health, but remains in the Hyatt Company in an advisory capacity.

H. J. Forsythe, formerly assistant general manager of the bearings division, has been appointed general manager.

B. G. Koether in addition to his duties as vice president in charge of sales becomes assistant general manager.

Mr. and Mrs. Alfred P. Sloan, Jr., sailed on the Aquitania July 4 to visit England, France and Switzerland. Mr. Sloan is vice president of General Motors Corporation in charge of operations. His trip is in the nature of a vacation. However, while in London and Paris he will look over the General Motors interests in these two cities.



This Giant Hauler Apparently Baulks at Nothing in the Way of Loads.

Smith Says Service Is Keynote of All Motor Truck Sales

Considers Element of Time in Securing Parts from Factory a Most Important Adjunct That Is Reflected in Increased Profits for Dealer.

ALMA, MICH., July 12.—According to Col. Frank E. Smith, president and general manager of the Republic Sales Corporation, "service is proving to be the keynote of the entire sales situation in the motor truck industry."

"Operators are today more insistent than ever that the trucks they buy be supported by adequate local service facilities to guarantee against unprofitable interruptions in operation."

"Of course, local service facilities can only be as efficient as the source from which they secure their repair parts, and this factor has been made the subject of special study by the Republic organization in order that the 75,000 or more Republic trucks in use will be given the type of service that completely satisfies owners."

"To show how important we consider the element of time in servicing trucks, our service department at Alma reports that during April a total of 3157 parts orders were entered. Of this number 3143, or 99.6 per cent., were shipped the same day they were received. In May, 3153 orders were booked, of which 3138, or 99.5 per cent., were shipped on the day of receipt. June showed a total of 3680 orders, of which 3658, or 99 per cent., were put in transit before the close of the day on which they arrived."

"The result of stressing promptness in parts shipments from the Alma factory is clearly shown in our current sales reports. Our branch houses as well as our distributors state that local truck users are becoming more and more impressed with our system of instantaneous service. The satisfaction which they experience is being passed on to prospective truck buyers."

MIDWEST IS ON WAY TO SPEEDY RECOVERY.

INDIANAPOLIS, IND., July 10.—Announcement is made by Oscar E. Stevens, one of the receivers of the Midwest Engine Company, that subscriptions totaling \$1,000,000 to the refunding bonds of the Midwest Engine Company have been received, thereby insuring a speedy reorganization of the company and at the same time providing adequate working capital. The Midwest Engine Company owns and operates a large plant at 19th street and Columbia avenue in the manufacture of engines, motors and other equipment, and also the Hill Pump Works at Anderson, Ind.

Some time ago in order to protect all interests the company was placed in charge of receivers—a friendly action, and within the last few weeks the receivers, Oscar E. Stevens and Frederick VanNuys, have been operating both profitably, showing a steady growth in busi-

SEES AID IN TRUCKS.

T. C. POWELL, vice president of the Erie Railroad, remarked in a recent address that "The railroads must be relieved of the unprofitable short-haul and terminal traffic and they look to the motor truck, including the farm motor truck, to bring this about."

ness. The sale of the issue of \$1,000,000 bonds now makes it possible, Mr. Stevens said, to affect a reorganization of the company, into the Midwest Engine Corporation, with an authorized issue of \$5,000,000 preferred stock and 125,000 shares of common stock of no par value.

Plans for the reorganization, especially as to the personnel of the official family, have not been announced, but it is understood that no changes are contemplated in the present staff of executives.

Mr. Stevens yesterday gave the following statement relative to the status of the Midwest Engine Company:

"The preferred stockholders' committee, whose task it has been to obtain subscriptions totaling \$1,000,000 to the refunding mortgage bonds of the new Midwest Engine Corporation, is prepared to report to the reorganization committee that the necessary amount has been subscribed, mostly by the old stockholders."

"For the purpose of completing the transfer of the assets from the old company to the new, the property will be offered at a judicial sale on or about July

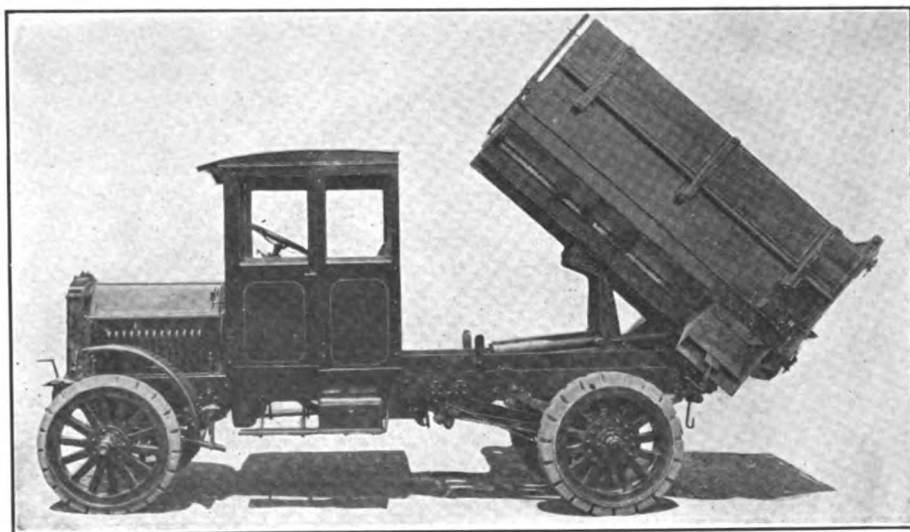
11. Notices will shortly be mailed to all creditors and stockholders to this effect.

"All claims against the old company must be filed with the receivers or with the Marion County Superior Court, room 3, Judge Solon J. Carter, on or before June 29."

"The receivers, Mr. Oscar E. Stevens and Mr. Frederick VanNuys, report substantial operating gains at both plants."

NEW MEMBERS ELECTED TO M. AND A. M. A.

NEW YORK, July 12.—The following companies have recently been elected to membership in the Motor and Accessory Manufacturers Association, according to a recent announcement: Akron-Selle Company, Akron, O., screw machine parts, metal stampings, truck bodies, gasoline gauges; Broad Brook Company, New York, N. Y., automobile fabrics; Buckeye Forging Company, Cleveland, O., automotive brake rod assemblies and drop forgings; Douglas & Lomason Company, Detroit, Mich., windshields, running boards; L. H. Gilmer & Company, Philadelphia, Pa., cotton woven endless belts and belting; Glidden Company, paints and varnishes; Harvey Spring & Forging Co., Racine, Wis., automobile leaf springs; Holley Carburetor & Company, Detroit, Mich., gasoline and kerosene carburetors; the Houdaille Company, Buffalo, N. Y., fittings for shock absorbers; Indiana Steel Products Company, Chicago, Ill., magnets, cold rolled and drawn steel and wire products; Nairn Linoleum Company, New York, N. Y., linoleum; the Phara Manufacturing Company, Bethlehem, Pa., governors for trucks and tractors; Spencer-Smith Machine Company, Howell, Mich., pistons; Stemco Engineering Company (reinstated) Dayton, O., gasoline gauges; Ternstedt Manufacturing Company, Detroit, Mich., automobile hardware; Universal Products Company, Detroit, Mich., universal joints; Westinghouse Lamp Company, New York, N. Y.; mazda miniature lamps and spark "c" ignition testers; Wickey Battery Company, El. Chicago, Ind., semi-dry rechargeable storage batteries; Wyman-Gordon Company, Worcester, Mass., forgings.



A Short Wheelbase Makes the Schacht Truck Handy for Highway Building.

General Motors Company Builds Three Truck-Tractor Models

Designed for Use with Trailers Machines Will Pull 15 Tons and Reduce Haulage Cost States Company—Conform to Road Laws of States.

PONTIAC, MICH., July 12.—Three new models of truck tractors, designed to greatly reduce hauling costs, have been placed on the market by the General Motors Truck Company. The tractors are designed to meet a growing need in the transportation business for an adequate power plant to haul "semi" and full trailers, carrying a load as high as 15 tons, the company says.

The new tractor-trailer combination, the company says, will reduce transportation costs in some instances as much as 50 per cent. and will enable a concern to transport goods over any state highway under a load as high as 15 tons, without violating any state laws governing truck loads. This is accomplished by the GMC factory so designing the tractor that the huge load is distributed evenly over from six to eight wheels, which, it is said, will comply with all state laws governing pounds per wheel truck loading.

The new tractors are to be put out in five-ton and 15-ton models and are designed to meet every need which can be asked of a truck tractor.

RESISTANCE OF ROADS BEING STUDIED.

WASHINGTON, D. C., July 14.—Initial results secured from an investigation of the tractive resistance of roads indicate that information will be secured of great value to the highway engineer and the user of motor transport. The investiga-

tions are being carried on under the auspices of the Advisory Board on Highway Research of the National Research Council with which the Bureau of Public Roads, United States Department of Agriculture, and the Quartermaster Corps, United States Army, are cooperating.

One phase of the investigation shows that there is a great difference in the power required of the engine when a truck is traveling over different types of surfaces, the amount being more than twice as great on some of the lower types when compared with that on higher types. It is also shown that the power required to overcome the road resistance is not proportional to the speed of the vehicle and after a certain speed is reached increases very rapidly.

The investigation when complete will cover tests with various types of motor vehicles with the load, tire and spring equipment varied on different types of surfacing and at varying speeds. The data will include gasoline consumption, internal engine resistance, wind resistance and road surface resistance.

NEW MODEL OF KELLY-SPRINGFIELD.

SPRINGFIELD, O., July 11.—The Kelly-Springfield Motor Truck Company will make an announcement of a new model within the next two weeks according to the statement made by Frank H. Peitach, the general manager of the company.

It was also stated that orders were gradually increasing. An order recently was filled for motor buses for a copper company in Nevada. The Baltimore & Ohio railroad have also placed a large order for rail motor buses, it is stated.

EDUCATES INSPECTORS TO INSPECT PAVING.

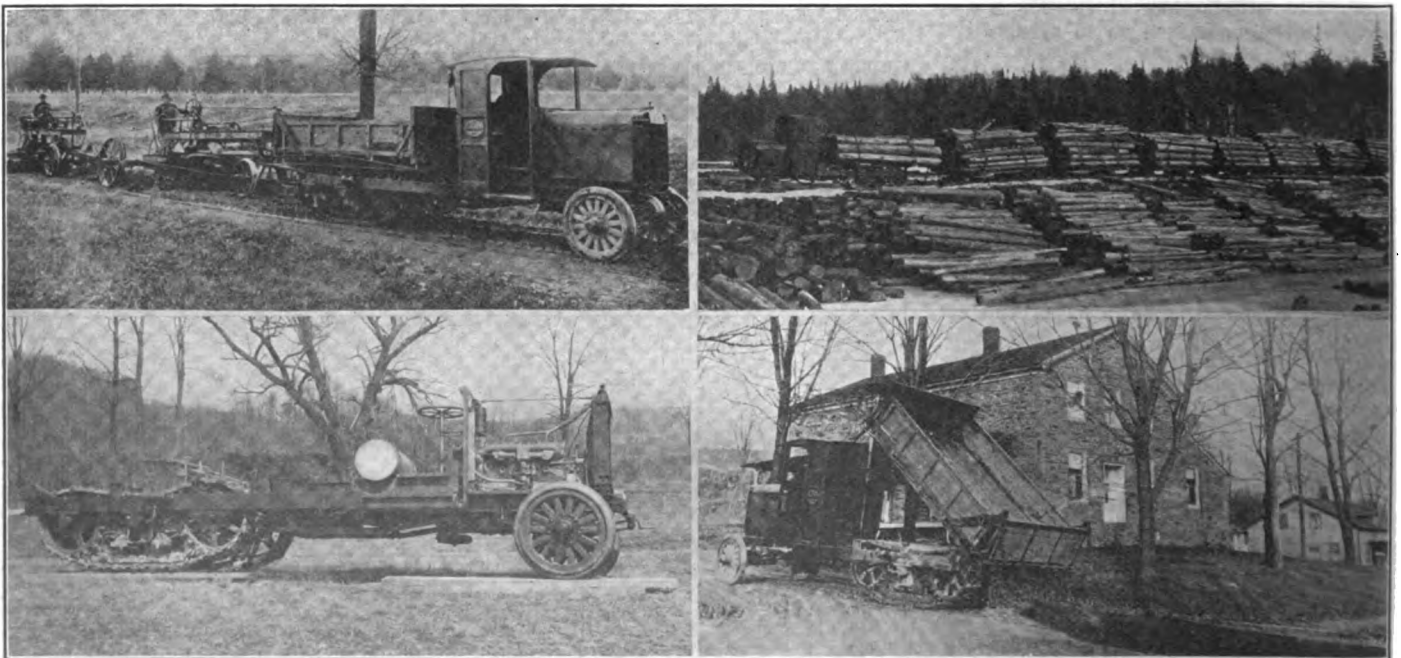
RALEIGH, N. C., July 3.—North Carolina, in carrying out its \$50,000,000 highway programme, has introduced a departure that promises to set a swift pace for other states to follow. As a means of qualifying its inspectors for the inspection of bituminous paving the North Carolina State Highway Commission, through its division of tests and investigations, has established a short course in road laboratory and plant instruction.

The course is necessarily a short one and consists of taking the men into the laboratory for about a week to learn the different tests of the materials used and to attend lectures by the supervisors of all types of construction.

After the laboratory and lecture courses are over the men are taken to the various plans for instruction in the duties of the plant inspector and then on the road for instruction regarding the construction methods to be used.

The men for this work were secured mostly from the different districts into which the work of the State Highway Commission is divided. The number of men from each district is proportional to the amount of construction to be carried on. This will allow the men to be located in the same district they came from, and the only need for any change would be in the demand for emergency inspection from another part of the state.

When carefully analyzed it will aid the highway engineer in determining under a given set of conditions what type of surface should be built for a given volume of traffic to result in the least total cost for road and vehicle operation.



This Linn Tractor-Truck is Exceedingly Useful for All Kinds of Heavy Work Where Sustained Effort Is Required.

Bus Line from Los Angeles to New York Now Being Planned

First Trip Will Be Undertaken in Near Future Say Officials Responsible for Transcontinental System—Itinerary Includes All Points of Interest.

LOS ANGELES, CAL., July 11.—A fact is about to be realized which but a few years ago would have been considered a "pipe dream." The plans for a transcontinental motor bus system are being formulated in this city and the first trip will be undertaken in the near future, it is stated. The buses for this service have already been purchased by the J. Raymond Wilson Company and are standard in all respects except for a few additional features such as weather proof luggage carriers and thermos bottle compartments.

The cost of the trip, including all incidentals, is to be \$850, it is stated. Practically every point of interest will be included in the itinerary. Among the most important ones visited will be Valley Forge, Gettysburg, Royal Gorge, Cripple Creek, Pikes Peak, Grand Canyon, Colorado Springs and the National Parks.

MILWAUKEE DEMANDS MORE TRUCKS.

MILWAUKEE, WIS., July 11.—The demand for motor trucks is steadily improving in this city. At the first part of the year they made little headway according to the retail trade. Most of the sales appear to be in trucks of $\frac{3}{4}$ to $1\frac{1}{2}$ tons capacity, but the heavier models are starting to move slowly. Construction contractors and builders have been responsible for some large fleet sales which have been made. These range mostly between three and five-ton capacities and usually are equipped with special bodies.

The motor bus trade is fast becoming a distinct feature in Milwaukee and in fact over the entire State of Wisconsin.

The bus so popular in the far West seems destined to occupy a high place here, since Wisconsin and especially the Milwaukee district, is filled with lakes and summer resorts.

INDIANA TRUCK GETS LARGE ORDER.

MARION, IND., July 10.—An order has been placed with the Indiana Truck Corporation for a large number of their trucks by the Joseph A. Butt Truck Company, rear 1201 Block, N. Broadway, Baltimore, Md. This company is also taking the distribution of the Indiana trucks in Baltimore, Hartford, Cecil, Carroll, Howard, Frederick, Anne Arundel, Calvert, Charles and St. Mary's counties in Maryland. It is reported from this territory that prospects for sales are very encouraging and the outlook for future business is extremely gratifying.

Reports indicate a large and prosperous year for the sterling products of the Indiana Truck Corporation.

ROAD MAKING INDUSTRY ONE OF LARGEST.

WASHINGTON, D. C., July 14.—Road building is one of the nation's largest industries, according to statistics compiled by the Bureau of Public Roads, United States Department of Agriculture, and surpasses such great industries as the manufacture of steel and iron as well as the production, sale and repair of automobiles. In December, 1920, less than 600,000 men were employed in the steel and iron industry. It is estimated that last year something like 750,000 men were engaged in making, selling and re-

pairing automobiles. As compared with this, an army of approximately 1,000,000 men labored last year throughout the road construction season in building and repairing the country's highways.

Fifty million tons of stone and gravel will be required by the 28,000 miles of Federal aid roads either completed or under construction in the United States at the end of the present fiscal year, according to the estimates of the Bureau of Public Roads. Some idea of the quantity is given by the fact that it is equal to a million carloads. If the material were piled in one place in the form of a cube it would be approximately 1000 feet in each direction.

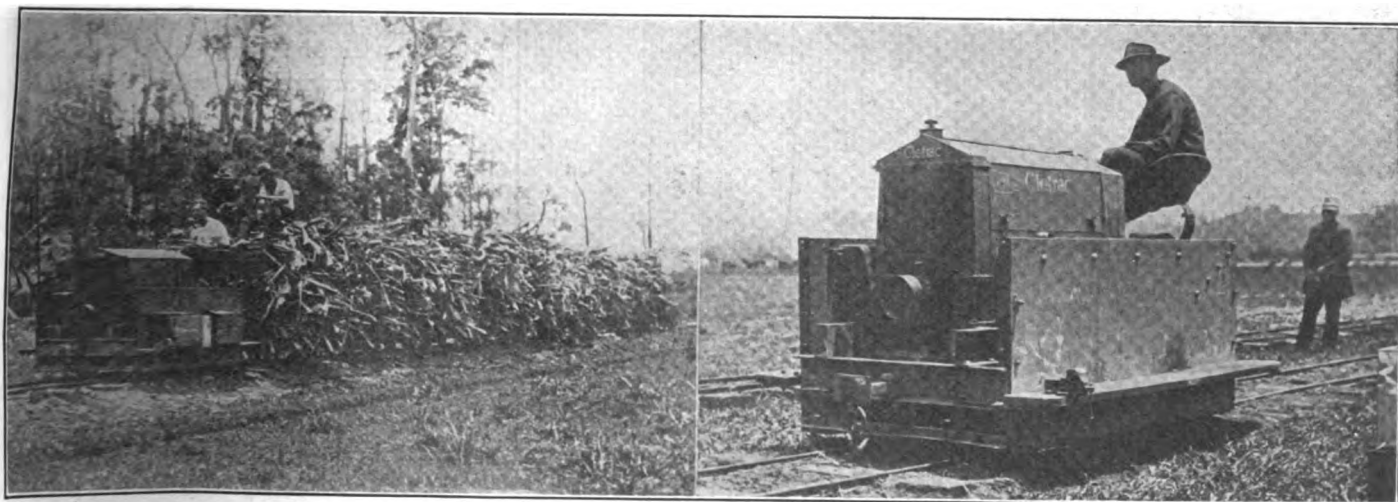
BUS COMPETITION REDUCES RAIL RATE.

MILWAUKEE, WIS., July 10.—Six Wisconsin electric railway companies have been forced to reduce interurban fares on 300 miles of roadway, it is stated. This reduction was caused by the sharp competition of buses, which caused the railroads to introduce interchangeable mileage books, effecting a saving of approximately \$1000 a day to the traveling public, business houses and railroad patrons. This announcement was made by J. P. Pulliam, Milwaukee, president of the Wisconsin Utilities Commission, after a conference of railway heads.

BANKRUPTCY PROCEEDINGS FOR ELECTRIC TRUCK.

SYRACUSE, N. Y., July 10.—A voluntary petition in bankruptcy has been filed by the Binghamton Electric Truck Company of Binghamton in the Federal court at Utica, showing liabilities of \$14,234 and assets of \$15,379. When the company was formed, \$100,000 worth of stock was sold, but it is alleged that the only asset remaining is the machinery at the plant at Binghamton.

The petition states that the reason for this action is the failure of the city of Hudson, N. Y., to pay a sum of money to the concern for locating its plant there.



Cletrac Used as Industrial Locomotive by Sugar Cane Grower Gives Good Results When Run on Conventional Track.

The New Nelson Motor Truck

THE Nelson Motor Truck Company has developed a new and highly special motor coach chassis, of which pictures are shown on these pages. Every part of this chassis is of entirely new design, and no part of it in any way resembles ordinary truck design. The design is on the order of a large luxurious automobile. Whereas in certain types of truck design the rear axle carries about 90 per cent. of the load, the Nelson design, states the manufacturer, gives a load distribution of 50 per cent. on each axle of the chassis weight and only 60 per cent. of the body and passenger load on the rear axle. The body is a product of Hoover Body Company.

The sides are of plymetal, the roof is Haskelite covered with duck, all mouldings are aluminum, curved corners of body are buffed from 14 gauge aluminum, all glass is set in rubber with brass side posts in window frames.

THE roof construction has no posts and is so designed as to make it entirely impossible to sag the roof even by a heavy man swinging from the hand rails. All windows are fitted with double A plate glass. The lighting is such as to make it perfectly easy for passengers to read newspapers as well or better than in the average street car.

The aisle and lobby at rear gives plenty of room for standees and the floor and seat arrangement at front end makes crowding and jostling of passengers or driver impossible.

The seats are of extra length, upholstered with good springs and Spanish leather, and the spacing of

seats gives plenty of room for two passengers to sit in comfort without crowding knees or elbows.

Destination sign boxes over driver's head at his right and "recognition boxes" using selective colors of lights installed at left of destination box using combinations of lights to denote routes will be furnished to suit purchasers. In addition to eight dome lights in the passenger compartment the coach has a dome light over the driver, light in sign box, light on step and light beside fare box, as well as the usual head lights and rear lights.

All wiring is in heavy insulation and all centering behind a hinged switch panel in wall at left of driver.

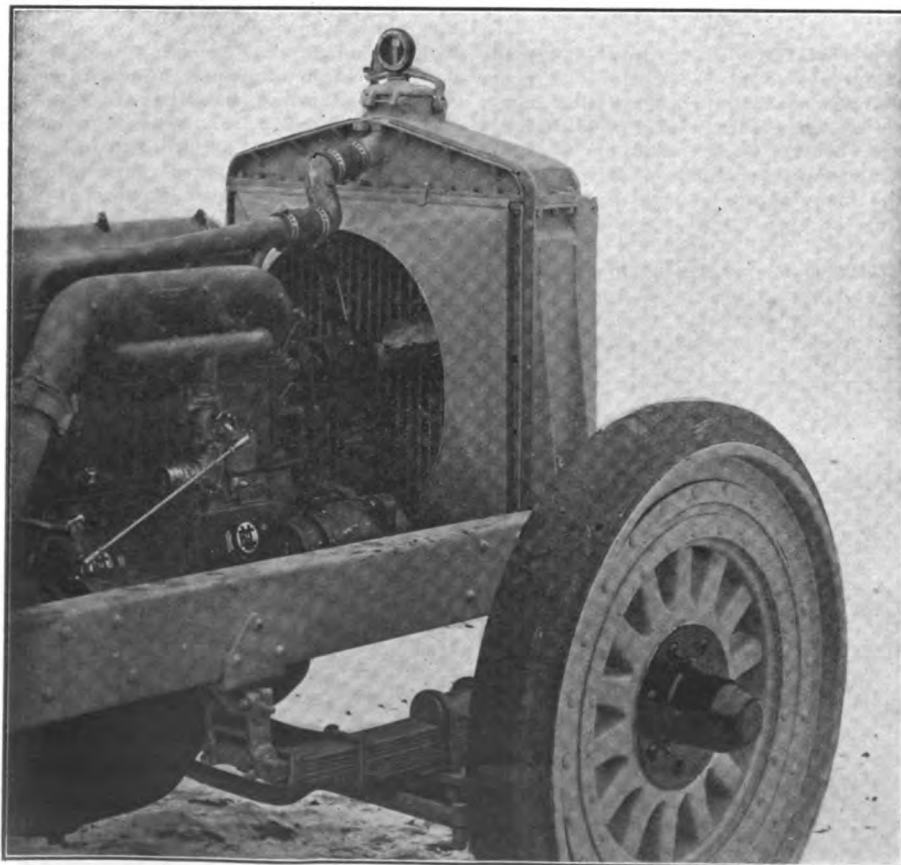
Buzzers with flush push buttons are provided at each seat. The chassis can be equipped with either wood or steel wheels, with solid or pneumatic tires.

Chassis Specifications—Wheelbase for 21-passenger, 172 inches; wheelbase for 25-27-passenger, 200 inches; chassis weight, 5300 pounds; height from ground to top of floor with 36-inch wheels, 26 inches; clearances, front axle, seven inches; motor base, eight inches; rear axle, differential, 10 inches; spring clips, eight inches; width of frame at rear axle, 54 inches; road tread, 74 inches on wheel centers; width overall, 84 inches; spring dimensions, rears, 58 by 3½ inches; fronts, 36 by three inches.

Power Plant—Buda EBU coach motor, 4¼ by 5½; thermostat control, perfectly balanced crankshaft, polished and ground combustion chambers, aluminum crank case, vacuum oil control with oil pumped to all bearings. Unit power plant type transmission, with oil disc clutch. Magneto ignition, two generator system, and two storage batteries and starting motor. Radiator provided with shutters for winter use, cast iron frame and tanks, seamless copper tubing, with large oversize capacity for cooling under all conditions and pump circulation.

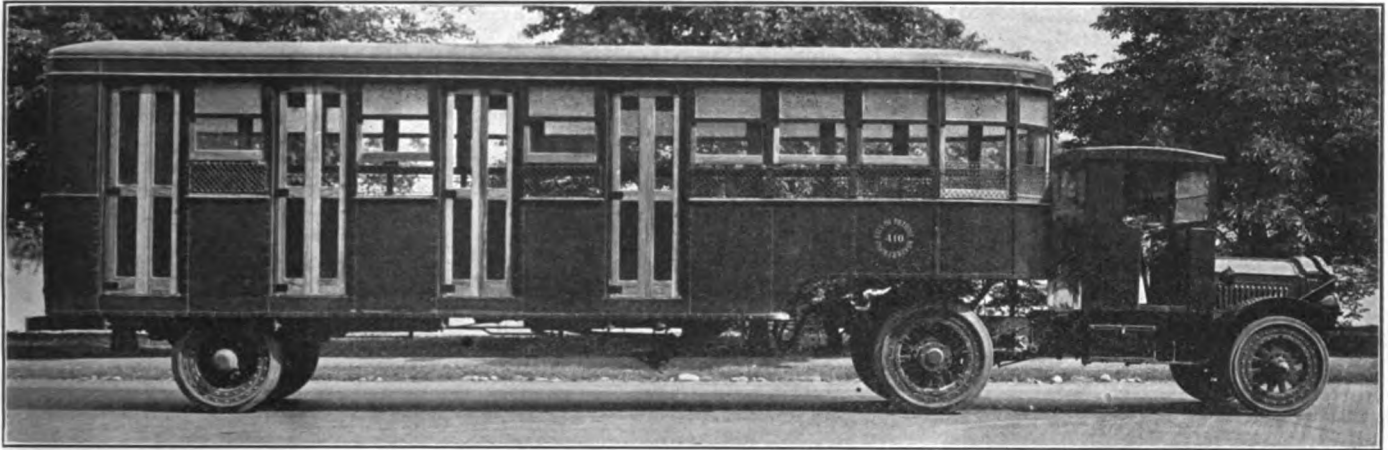
Axles and Propellor Shaft—Rear axle, Clark 3 D special coach axle internal gear drive. Front axle, Nelson Shuler special drop forged motor coach axle, 3½-ton capacity. Three-joint propellor shaft, with propellor shaft brake and using external brakes on brake drums for emergency.

(Continued on Page 397.)



The Nelson Truck Uses Chrome Vanadium Springs Scientifically Designed.

Has Room for 135 Passengers



The Truck Which Hauls This Fruehauf Trailer Bus May Be Used for Other Purposes at Any Time.

A NOVEL six-wheel bus has recently been designed by the Fruehauf Trailer Company of Detroit for the Department of Parks and Boulevards of that city. It is used for carrying passengers between the Jefferson avenue bridge approach and Belle Island Park and it is believed to be the first unit of its kind to be used in the country.

With a seating capacity for 66 people it is said by

the company to be the largest single-deck bus in service. All loading and unloading is from platforms and with the four folding doors provided, large crowds are handled in a very few minutes. The doors being operated by compressed air, the driver is able to control them without leaving his seat. The trailer is also equipped with air controlled brakes connected to the driver's cab.

BOTH doors and brakes are operated with the same valve and it is impossible to open the doors without first setting the brakes; likewise the brakes cannot be released without the doors being closed. With the service and emergency brakes which are standard equipment on the truck, three complete and separate sets of braking systems are provided which may be operated independently or at one time, insuring maximum safety.

The bus is equipped with long, flat springs of special alloy steel and cushion wheels are used on both truck and trailer. The inside of the bus has an appearance similar to a modern street car with cane upholstered seats. The side walls of the interior are finished in natural oak and the ceiling in imitation mahogany. Ventilation is provided by ventilators installed through the roof and the lighting is taken care of from a storage battery on the motor truck. While the bus body is 29 feet long the vehicle can be turned in a radius of 39½ feet. In spite of its size the driver has no difficulty in handling it, even in most congested traffic. In fact it is when

the large crowds are patronizing Belle Isle that this bus proves its real value, as it has carried as many as 135 passengers at one time. Within a few days its practicability has been so thoroughly established that another unit has been ordered to be delivered as soon as possible.

The truck is a 3½-ton model with wheelbase of 10 feet, the total wheelbase being 30 feet and overall length 37 feet. Compressed air for operating doors and brakes is carried in a small tank fastened on the running

board of the truck and is supplied by pump driven from the engine. The connection to the trailer is through flexible tubing with quick detachable couplings.

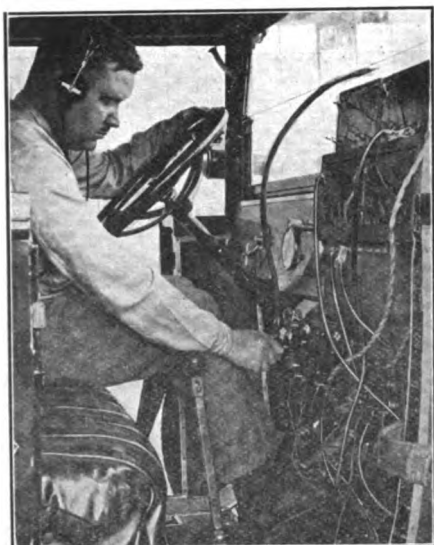
One of the outstanding features of the unit is that the motor truck may be used every day in the year. The trailer is detachable and equipped with supports at the front end (ordinarily folded underneath) on which it rests when disconnected from the truck. Platform or dump body trailers may be attached for other kinds of work. The truck is earning continuously instead of during the short summer season when carrying passengers. In the winter it will probably be used exclusively for trucking. Many people from other cities have called to inspect this unit. It is believed to have great possibilities for general passenger service, on account of its large carrying capacity, and because of the quick detachable feature. If the motor truck met with an accident or mechanical troubles were encountered, another reserve power plant could be placed under the trailer body within three minutes of the time of the accident.

RAILROAD SAVED BY MOTORIZED EQUIPMENT.

LAKEVIEW, CAL., July 12.—The Nevada-California-Oregon Railroad has decided to equip the line between Sackstaff and Lakeview holdings with motor cars instead of abandoning it, it is stated.

Daily passenger and freight service will be given. This is expected to solve the problem of a different stretch of road, for which the railroad commission had been planning tri-weekly service as an alternative to sale of the line to the Western Pacific Railroad, and a general reorganization of traffic conditions. The latter is still before the Interstate Railroad Commission, before which Charles Moran, president of the line, recently presented data showing the feasibility of motor transportation.

Bus Passengers Ride to Music



"Tuning-in." When Added to the Job of Driving the Bus Keeps the Operator Busy.

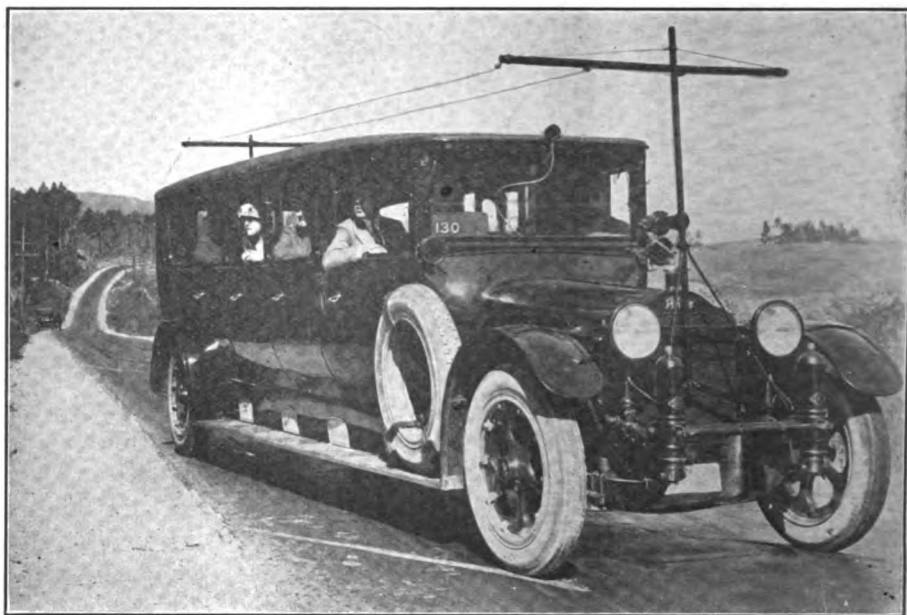
SHOULD tests which the California Transit Company of Oakland, Cal., started this week prove successful many of the 85 busses operated by this line will be equipped with radio phones to pick up daily radio concerts in the bay region.

W. E. Travis, president of the California Transit Company, sent the first radio equipped bus out on its regular run to Sacramento and in spite of the obstacles which confronted the test enough information

was obtained to warrant further experiments and to assure Mr. Travis that radio concerts would soon be a reality for his patrons.

With only a two-step radio short

At Sacramento a test was made by special arrangement with the Holbrecht broad casting station. It was found that by a sacrifice of speed the concert was as audible when the bus was in motion as when it was standing at the curb.



Touring De Luxe. An Easy Riding Bus, Fine Scenery and in Addition to All This a Concert by Radio. What More Could One Ask.

wave receiving outfit and handicapped by the necessity of operating with a low antenna, the bus was able to pick up San Francisco and Oakland concerts as far as Martinez.

According to officials of the bus company and radio men interested in the tests from a scientific angle, some refinements will be made and experiments continued until desired results at varying speeds are made.

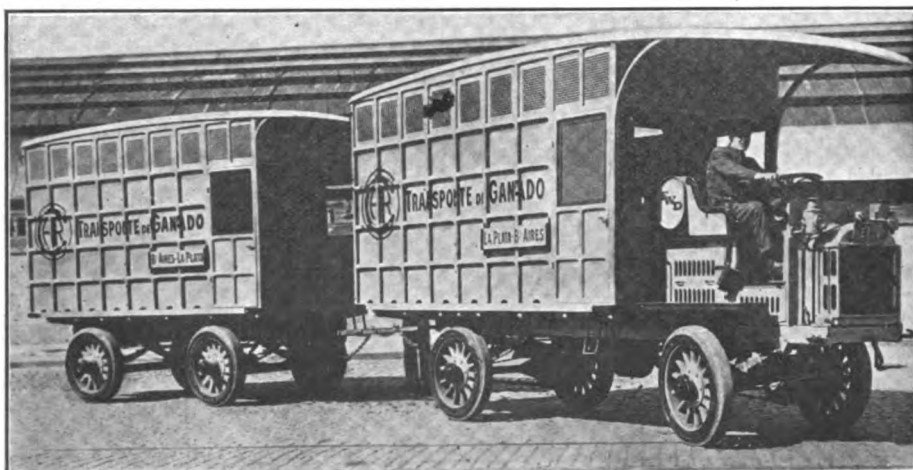
MOTOR VAN FOR THOROUGHBREDS

FOR comparatively short distances the motor truck has been found far superior to rail transportation for transporting race horses from one course to another in

Argentina, South America.

The Compania de Representaciones of Buenos Aires, Argentina, is responsible for the inauguration of such a motor transportation

system between the cities of Buenos Aires and La Plata, at which points very popular race courses are located. Their equipment consists of one FWD truck manufactured by the Four Wheel Drive Auto Company of Clintonville, Wis., and a three-ton trailer, each of which is equipped with a body capable of accommodating two horses and one or two attendants. These bodies are of special construction, each of them being divided into two stalls and the inside walls being padded to prevent any injury to horses in transit if they should be jostled about or if they should become frightened and kick. The back walls of the bodies are hinged at the bottom and can be let down to form a run way by which the horses can enter the stalls.



An FWD Truck with Special Trailer Body Is Used in South America for Transporting Race Horses from One Track to Another.

Dayton Cast Steel Dual Pneumatic Wheels

A Story of the Making of a Steel Motor Vehicle Wheel
Which in Design and Construction Is Conceded to Be
Correct and Which Meets with All Service Requirements

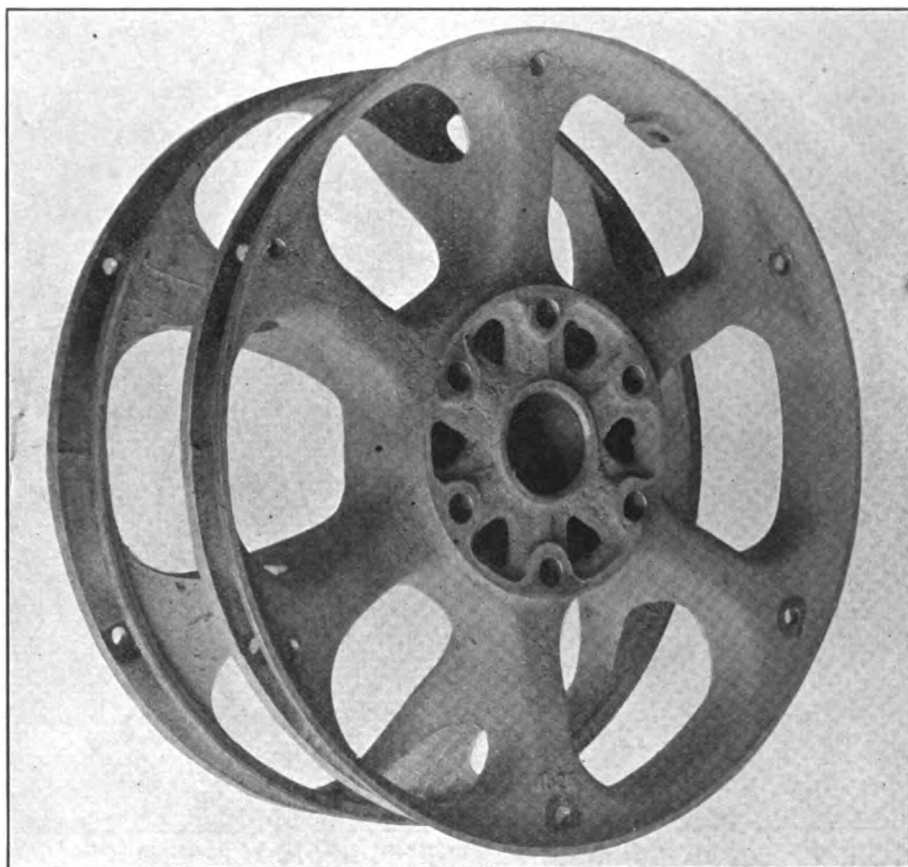
IN CHECKING and analyzing the wonderful development and achievements passed through in bringing the motor truck to the state of its present perfection, the natural tendency is at times to overlook the advancement made in many of the most important units.

Perfection of the engine, the carburetor, the universal joint, the cooling system, the differential and many more of the vital members are all closely followed today. But most people consider a wheel "just a wheel," never realizing and with but small appreciation of the extensive research and experimentation necessary to advance this vehicle necessity, from the crude crossed-board device, used in the early days, to the highly developed truck and automobile wheel we see today.

IN ANSWER to the question, "Which is of more importance, the truck engine or its wheels?" the following answer was given by an automotive engineer: "The engine of a truck may be removed, but still the wheels will roll the truck, but if the wheels are removed the engine may just as well be removed also." The wheel in all its shapes has proved to be one of the great developments of man's ingenuity despite the fact it has existed in various forms for centuries.

In the early ages half civilized people used vehicles of the crudest construction and mostly equipped with cruder wheels. These wheels were made by laying pieces of boards transversely across one another and fashioning the ends into a circular form. In a later age metal bands were made to surround these wooden wheels, which still rotated on wooden axles. Then one of our enterprising and ingenious ancestors developed a crude iron axle. Shortly afterward the iron axle box, made to be driven into the hub of the wooden wheel became almost universally adopted.

The advent of the steam locomotive, however, demanded a much stronger and more reliable wheel than could be constructed of wood, owing to its natural tendency to vary under different climatic conditions. In dry weather this type of wheel would shrink and in wet weather expand. To overcome these objections the metallic wheel with flanged sides was developed, per-



Distinctive Design and Hollow Construction Enhance the Strength and Aid in Giving This Wheel the Necessary Quality of Resilience.

fect and used.

For many years after the automobile first made its appearance the wooden wheel was largely used, and in order to supply additional resiliency was equipped with solid, then cushion and later with the pneumatic tire, which tended to protect the wheel from severe road shocks and stresses which were multiplied by the greater rate of speed traveled. In recent years the operation of power driven vehicles has naturally broadened in scope and embraces all

transportation from that of carrying passengers to the hauling of enormous loads over all kinds of highways which subject the wheels of the heavily laden conveyances to almost unbelievable strains.

Metallic wheels in a crude form had been tried up to a few years ago, but the degree of success attained for them was decidedly small. This was due to the inability of the metallurgist and engineers to compose and design a complete metal wheel which would meet all necessary

requisites for truck service.

Experiments Cover Period of Many Years.

In the year 1905 George Walther started a foundry in Dayton, O., where he applied his broad technical knowledge consistently and systematically for many years with the fixed purpose of eventually being able to offer to the motor vehicle industry a steel motor truck wheel that would be practically, as well as theoretically, correct in design, material and construction. That this

in steel, however, a point is reached at which the material assumes a permanent set, or in other words, upon being bent by a certain pressure it will not resume its original form after the pressure has been removed. This point is known as the elastic limit of the material and cannot be exceeded in the development of resiliency.

In order to more fully illustrate the advantage of resiliency in a wheel it is cited that if a heavily loaded truck traversed a bad

over the highways the more severe will be the blows that must be absorbed by the entire mechanism. In order to reduce such impacts solid tires are replaced by pneumatic shoes. This has the tendency to incorporate more resiliency for reasons well known to the reader. If the truck is operated over a poor roadbed the rubber absorbs some of the shock and the air within the tire takes care of an even greater amount.

If the shock is not now all absorbed it must necessarily be imparted to the axle, the differential and the other units in direct proportion to the severity of the impact, less the amount absorbed by the tires and the air they contain. If part of the shock not absorbed by the air and tires could be eliminated by the wheel, before reaching the axle, it can be readily seen how great the saving would be to both the tires and the truck itself.

Springs Do Not Solve Problem.

The force of the impacts have been dampened to some extent by equipping the truck with springs, but a greater amount remains to be absorbed by the wheels and tires. Maximum strength must be obtained through correctness of design in order that the weight of the wheel will not become so great as to prohibit its use. The two qualities, strength and weight, have close relative bearing to each other as by increasing the metal used in the making of the wheels the strength also will be increased, but the added weight requires more driving power and causes more wear. On the other hand, extreme lightness may be obtained by cutting the amount of material below that necessary to afford the strength required for a dependable wheel.

To perfect a design and to use only material by which comparative lightness combined with great strength could be obtained was the aim of Mr. Walther. He followed this aim with diligence until the wheel he finally perfected had all of these qualities to a marked degree and also was decidedly resilient

(Continued on Page 395.)



The Wide Graceful Curves, Designed Primarily for Strength, Also Eliminate Objectionable Dirt Catching Pockets and Crevices.

purpose has become a world wide realized fact, the production and prosperity of the Dayton Steel Foundry Company affords every proof.

Among the most necessary requirements for a successful wheel of this type are resiliency, strength, lightness, durability and economy. Resiliency is necessary in the truck wheel in order that it may absorb as many of the road shocks as possible without transmitting them to the tires or the mechanical units of the machine. In seeking the quality

stretch of roadbed with solid tires and wheels, the shocks or blows received by the axle of the truck would be numerous and of many thousand pounds each. The action which would take place in this example may be compared to the lifting and sudden dropping of a highly finished piece of mechanism, whether a watch, locomotive or a truck, and eventually it would be the cause of serious and permanent derangement. The height of the drop may be represented by the speed of the truck, as the faster it is traveling

Bus Succeeds Where Trolley Fails

Massachusetts Towns Solve Problem of Proper Passenger Transportation by Use of Gasoline Propelled Vehicles After Traction Company Removes Electric Cars.

IN MANY parts of New England buses are being used to good advantage. This is particularly true of the small towns and villages where the traffic is not heavy enough at times to warrant the use of other means of transportation, owing to the heavy overhead expenses which operation of these systems entail. The gasoline motor driven vehicle line has proved to be particularly well adapted to service these localities and under the direction of real business men should become one of the greatest aids to cheaper and more frequent means of transportation between city and towns, says those who have given the matter thought.

In the town of Foxborough, Mass., the question of transportation was of decidedly small importance to the average citizen in the years from 1902 to 1919, as the town was connected in all directions to surrounding communities by the Norfolk and Bristol Street Railway Company, an electric line which gave exceedingly good service:

IN 1919 the high cost of supplies and the demands of labor forced this company to discontinue operations.

As a result the great need of proper transportation was placed forcibly before the people of the communities through which this company had operated its cars. Some of the citizens of these towns wished to operate their own car lines and others wished to have jitneys. Finally the motor bus was turned to as the only practical solution of the problem and some time after the cessation of electric car service the Foxboro-Mansfield bus line started to operate between Foxboro, Mansfield and Wrentham. This company is incorporated with local stockholders and Francis M. Perry is the principal owner and manager.

Buses Run on Schedule.

The office of the company is so located that the buses must pass it on each of the many trips. This affords a ready check on the time schedule of the machines and punctuality is one of F. M. Perry's business principles. On a lower floor of this same building is a battery and accessory store conducted by a member of the organization from which the buses receive their supplies.

The company at present is operating a group of buses composed of Day Elders, Reos and White buses, which have given exceptionally good service. This may be due in an extent to the policy of the company in



Francis M. Perry

hiring only competent drivers that are well recommended, and in carefully servicing the vehicles; however, the good service given by each of the cars might well lead one to believe that the choice of the proper conveyance for this kind of business may be left to the personal preference of the prospective buyer. The largest bus on the line at present is a 30-passenger White.

On the trip from Mansfield to Foxboro one of the old settlers was asked by the writer for his opinion on the buses. He stated in no uncertain terms that in his opinion the buses were far in advance of any other means of transportation for

traveling back and forth every day and despite the fact that he had passed the three score mark he far preferred to ride on a bus than an electric car.

Conform to Train Schedule.

The schedule on which the buses are run is arranged to conform as closely as possible with the steam train schedule of the New York, New Haven and Hartford railroad at its station in Mansfield, for many of the residents of this typical New England village commute daily to Boston.

Care of Buses.

The drivers of the company's buses are all attired in snappy khaki uniforms and each of these drivers understands the mechanism of the machine he is driving, as well as the care required to keep it operating in the most desirable way. In the morning each bus is thoroughly gone over by the driver before starting on the daily trips and is supplied with gasoline, oil and water. Tires are inflated if necessary and their general condition noted.

The proper lubrication of the buses is considered to be of the utmost importance and at each trip by the supply station, fresh oil or grease is added by the attendant if necessary. A careful tally is kept on the amount of supplies used and the reports are handed in to the office. Each morning the attendant at the supply station checks up the supply of fuel and oil on hand and

(Continued on Page 393.)

Goldie Made Ruggles General Manager

R. J. GOLDIE, for six years factory manager of the Columbia Axle Company, has been appointed general manager of the Ruggles Motor Truck Company, Saginaw, Mich. Frank W. Ruggles, who had been functioning as general manager since the foundation of the company, will remain as president, but will devote himself to the wider interests of the business.

MR. GOLDIE has won recognition in the automotive industry as an organizer. Among his friends he is said to have the magic "Midas touch," as every company with which he has been identified has prospered.

Years ago he built one of the first 1500 pounds motor trucks ever used in Detroit. It was used for five years to deliver pies. As Mr. Goldie whimsically puts it, "This truck laid the foundation of the motion picture industry and thereby made a fortune for Charley Chaplin."

He also built the first Oakland



R. J. Goldie, Prominent in the Automotive Industry for Many Years Who Has Been Appointed General Manager for Ruggles Motor Truck Company.

automobile, another automotive success. He drove an Oakland car in the 1908 Glidden tour—a two-cylindered vertical engine affair that was considered the "cat's overalls" in those days.

After two years with the Oak-

land the Chalmers organization recognized the good fortune that came to concerns when the name Goldie was on the pay roll, and secured him as chief inspector and superintendent for the Chalmers plant. The Chalmers, it will be noted, is another company that is still in the ring and going strong.

The Chalmers company was able to retain Mr. Goldie just five years, when he felt the call of specialized manufacture and joined the Timken-Detroit Axle Company, as manager of its east side plant.

He spent five years with the Timken-Detroit organization, materially contributing to their success and then in 1916 became factory manager and member of the board of directors of the Columbia Axle Company. He still retains his place on the directorate of that company.

Mr. Goldie brings to the Ruggles Motor Truck Company a wide experience in automotive manufacturing, together with an executive ability developed through many years spent in responsible positions.

HOME WAS NEVER LIKE THIS

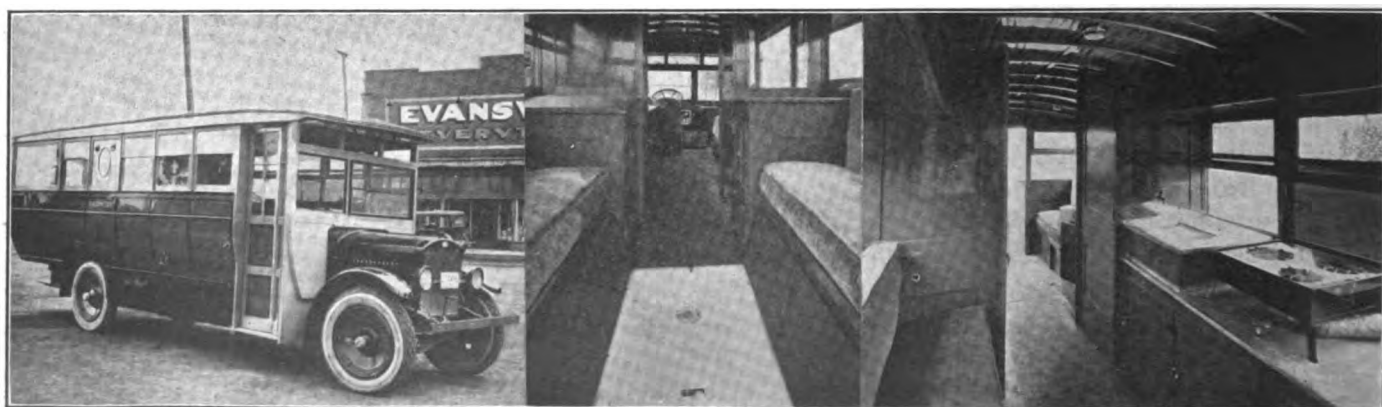
C. F. ROUZE designed the body shown below for touring with his wife from Detroit to Yellowstone Park and Kansas City. The body was built to his special specifications by an Evansville, Ind., firm and driven overland to Detroit, during the trip attracting great crowds wherever the party chanced to stop. No trouble was ex-

perienced through the journey.

The unique body is mounted on a General Motors Truck Company bus chassis and is equipped with every conceivable comfort for touring. The driver sits inside the body at the left of the car and the machine is controlled by center gear shifts and the usual touring car arrangement of clutch, brake and

wheel controls. Directly back of him, on either side of the car, are two long rows of seats, which with chairs scattered about the interior will take care of 14 people.

At night these seats unfold and there are beds for four. An arrangement of kitchen utensils which would delight the eye of any woman have been accomplished.



Drawing Room, Dining Room, Kitchen, Bath and the Essential Toilet Necessities All Combine to Make the "Tour-More" the Last Word in Comfortable, Convenient Touring. (Note Location of Bath Tub.)

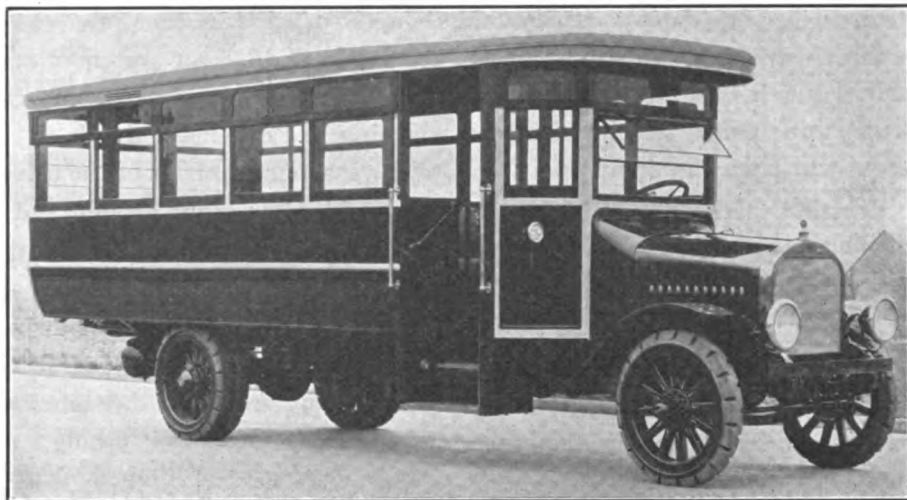
Mack Builds Bus Body

MACK shock-insulated 25-passenger bus chassis are now being equipped with a new type of body, designed and built in the Mack factory, as a result of experience with many different types of street car and motor body builders' products and about two years experiments in original construction. The new body has been designed to provide the utmost stiffness and strength, the maximum resistance to vi-

bration and weaving stresses and, at the same time, a considerable reduction in the weight which is usually found in bodies of its size. These results have not been achieved by any single or revolutionary departure in coach building methods, but by a combination of refinements, each of which has contributed to improvement in strength and durability on the one hand and reduction in weight on the other.

DUE regard has been given to the matter of appearance, roominess and passenger comfort, matters not easily compatible with rugged structure and low weight. In its design the object has been to make a body which will most nearly meet average requirements. Cheapness has not been attempted, but extravagant limousine effects have been avoided. The body, which weighs 2700 pounds complete, is of conservative construction and appearance and has been built expressly for one chassis, namely, the Mack AB shock insulated bus. This has naturally simplified the problem, somewhat, since it was not necessary to consider the different frame widths, wheelbases, floor obstructions and floor heights which occur in different makes of chassis.

The body is of the conventional front-entrance type, with enclosed steps and collapsible leaf door, having five windows and the door on one side and six windows on the other. The front corners of the body are beveled in a bay window effect and the rear corners are rounded on a large radius. There are four horizontal panels, carried right around the back from one side to the other. Below the windows is a broad perpendicular belt, separated from the lower panel by a heavy wood guardrail to prevent denting of the body by side swipes. The lower panel has a deep inward curve at its lower portion. Above the windows are small transoms, increasing natural interior illumination and affording standees direct vision. Above the transoms is a broad band beneath the eaves, which carries the louvre type ventilators. The roof is of the crowned canopy type, appear-



Easy Entrance for Passengers Is a Feature of the New Bus Which Is Built Complete in the Shops of the Mack Company.

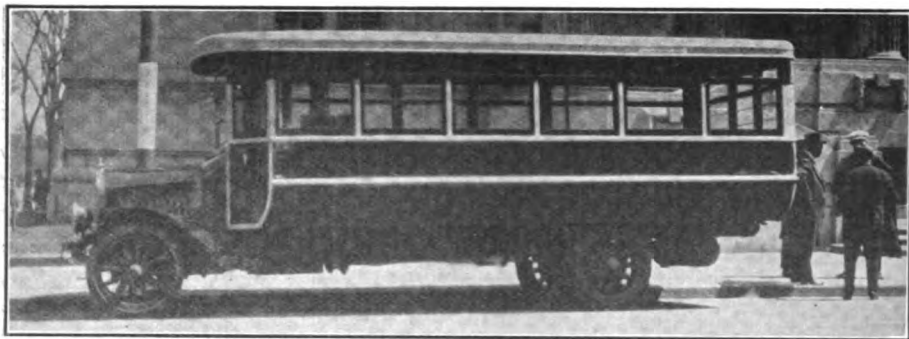
ing perfectly flat from the outside. The back wall is provided with three windows of the same type as the side ones with transoms. The middle window is carried in a concealed emergency door, fitting perfectly flush on the outside. No break occurs in the lower panel at the rear wheels, the wheel house being concealed, as permitted by its small height, due to the use of 34-inch wheels on this chassis.

Within there are six standard two-passenger cross seats, extending back from the front of the bus to the wheel houses. Over the wheel houses are lengthwise seats, accommodating four passengers each and across the back a wide cross seat for five. The seat has three cushions, the middle of which is removable to afford access to the emergency door. The driver's seat is of the bucket type, mounted on top of the tool box.

The floor is of tongue and grooved hard wood, 1¼ inches thick, laid directly across the frame and covered with cord linoleum, cemented on

and bound with steel. White oak and ash framing is used, all body stanchions and roof bows being steam bent to shape instead of sawed, as is usual. This insures strength and rigidity through proper direction of the grain at all points, whereas sawed members are apt to be cross-grained at points subjected to strain. Steel gussets are used to brace the stanchions to the frame and deep pressed steel under braces are used to support the outer edges of the body. Heavy gage sheet aluminum is used for the sheathing to secure lighter weight, rust proofness, greater freedom from cracking at edges and around holes and freedom from noise, as compared with steel. Door and window frames are of solid mahogany. Windows are glazed with grade A glass of the best manufacture and of a thickness to withstand sudden stress.

The door has clear glass upper panes and polished plate wire glass lower panes. The edge is provided with a soft rubber pad. It is operated by means of a crank to the left of the driver through overhead rods,



The Finished Bus Makes a Well Designed, Balanced and Constructed Vehicle.

The emergency door is fitted with a three-way latch, the handle being inclosed in a shallow box covered with thin glass which must be broken to open the door.

Crystal plate glass of heavy thickness is used for the windshield, the frame being of metal, all panes swinging for ventilation, the upper portion being double. Over the windshield is a green visor. The front of the body is joined to the dash cowl by a leather diaphragm, thus providing flexibility at this point and preventing rattling. The

body is fitted with complete wiring for lights and buzzer system a step light working automatically by the opening and closing of the door. A roller sash curtain back of the driver is provided for night driving and a large mirror is mounted above the windshield to afford rear vision. Heating is by exhaust, the usual cast steam pipe with 90-degree elbows being replaced by tubes of thin shelby seamless tubing, no bends have greater than 45-degree angularity. The outside piping

leading from the heater valve to the inside of the body is lagged with asbestos air cell insulation to conserve heat and the interior pipes are covered with perforated metal grating. The heater valve is operated by a rod on the dash.

Seats are of the standard spring cushion and back type, with rattan covering. Of course special upholstery in leather, leatherette, whipcord or velour, with special springs etc., is available where required, though rattan seating is generally preferred for city service. There are four vertical tubular posts to serve as additional stiffeners and rod supports and as hand-holds for the passengers. In addition, each cross seat back has a handle, sanitary type straps are fitted in the rotunda at the rear and there are grab handles on both sides, inside and outside the door. There are advertising racks above the windows.

Prominent engineers who have ridden in the bus have given it the stamp of their approval.

The "Gasoline Summer Train"

THE gasoline summer train is the very latest in the development of light equipment for railroad service. A two-car unit of this type, manufactured by the Four Wheel Drive Auto Co., Clintonville, Wis., has just been completed. These cars are of the open type with adjustable curtains along the sides to provide protection for passengers against sun or rain.

The forward car of this unit has a seating capacity of 35 persons and the rear car can accommodate 50. Special care has been taken by the manufacturer in the designing of the bodies of these cars so that each seat provides ample room for five grown persons without crowding.

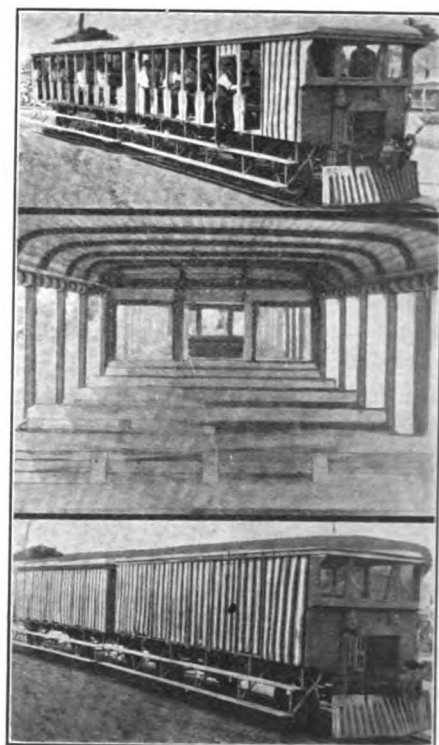
THE cars are equipped with air brakes, electric starting device and horn, standard MCB couplers, locomotive type "cow catcher" on the forward car, sanders for sanding the rails and high speed reverse gear which enables the cars to go as fast in reverse as they will go forward.

On short line railroads and especially on electric lines over which excursions are run in the summer time, the gasoline railway summer train appears to be the ideal installation for reducing operating costs and at the same time maintaining reliable transportation service.

During the test runs which have

been made with this equipment a speed of between 35 and 40 miles per hour has been attained. The cars have rounded curves up to 16 degrees curvature at a speed of 25 miles per hour, without the least trouble and are capable of rounding much sharper curves at a reduced speed.

This and other developments made by automotive manufacturers toward the perfection of light railway equipment is evidence of the fact that the automotive industry is awake to the requirements of railroads that are forced to reduce their cost of operation.



Short-Line Railroads That Have Been Compelled to Lower Operating Costs in Order to Maintain Profitable Service Have Found This Outfit to Give Good Results. It Is Especially Designed for the Summer Months and Is Cool and Airy at All Times. It Will Accommodate 85 Passengers.

New Diamond Taxicab

New York City Company to Operate Taxi of Distinctive Town Car Type Which Closely Resembles Those Used in European Countries.

THE Diamond Taxicab Company announces that its first fleet of taxicabs for New York City will be 1000. The contract for the first unit of 250 cabs has been executed by the officers of the corporation, and it is expected that the first cabs will be on the streets of New York City some time this month.

This taxicab is the result of two years of investigation and engineering by a group of automotive experts.

THE new taxicab will be of the distinctive town body type, with disc wheels, elegant, roomy, comfortable and easy riding. The company will maintain model garages in various parts of the city, containing club rooms, swimming pool, billiard room, etc., for the chauffeurs.

The Diamond Taxicab has been designed with accessible units, interchangeable and easy of replacement. It has wide doors and low body and not much glass.

The frame is especially designed to withstand taxicab service and all unnecessary parts and equipment have been eliminated in order to lighten the cab and eliminate troublesome service.

The body is designed along the lines of European taxicabs, being of the town car type, with removal panels for quick replacement in case of accident. The upholstery is removable so that the cab can be kept clean and sanitary at all times. By removing the upholstery the interior of the cab can be hosed out every morning in a few minutes without damage to any part.

The motor has been designed for taxicab service. Particular attention has been given to the elimination of vibration. The motor can be removed in 40 minutes.

Axles especially designed for taxicab work. Exceptionally heavy gears cut with coarse teeth. Oversized bearings throughout. Ratio of gear axle 5.1-1.

Clutch is strongly built and easy and powerful in action.

Transmission, gears are heat treated with large faces, long wear assured. Speed ratios correct for taxicab service.

Drive Shaft is oversized with a large margin of safety.

Steering Gear is of the split nut type used on majority of racing cars. Easy to operate.

Scoe Carburetor, can only be adjusted at the service station where a Master adjusting tool is carried.

Springs are genuine chrome vanadium steel.

Radiator is exceptionally large, the water system carrying over five gallons; thermos syphon cooling.

Disc Wheels, tires 31 by 4 cord, non-skid all around.

TRUCK OUTLOOK DECIDEDLY BRIGHT.

PONTIAC, MICH., July 9.—Vance H. Day, sales manager of the General Motor Truck Company, says that the month of June was the best one of the many through which the company has passed. He also asserted that the prospects for July were exceedingly bright, saying that despite the fact that a slight lull was encountered a short while ago, the activity of the agents more than made up the loss. The increase in the number of heavier models sold indicates that the industrial firms are back in the market for trucks, he said.

Annual Production of Motor Vehicles

Passenger and Commercial Combined.

Year	Number	Wholesale Value	Year	Number	Wholesale Value
*1899...	3,700	\$4,750,000	1912...	356,000	335,000,000
1903...	11,000	12,650,000	1913...	461,500	399,902,000
*1904...	21,975	30,864,616	*1914...	543,679	413,859,379
1905...	25,000	40,000,000	1915...	818,618	565,978,950
1906...	34,000	62,900,000	1916...	1,493,617	797,469,353
1908...	65,000	137,800,000	†1917...	1,740,792	1,053,505,781
*1909...	127,731	165,148,529	†1918...	926,388	801,937,925
1910...	187,000	225,000,000	1919...	1,657,652	1,461,785,925
1911...	210,000	262,500,000	1920...	1,883,158	1,809,170,963
1912...	378,000	\$378,000,000	1921...	1,514,000	1,093,918,000
1913...	485,000	425,000,000			
*1914...	569,045	458,957,843			
1915...	892,618	691,778,950			
1916...	1,583,617	954,969,353			
†1917...	1,868,947	1,274,488,449			
†1918...	1,153,637	1,236,106,917			
1919...	1,974,016	1,885,112,546			
1920...	2,205,197	2,232,927,628			
1921...	1,668,550	1,260,000,000			

Passenger Cars.

Year	Number	Wholesale Value
*1899...	3,700	\$4,750,000
*1904...	21,281	23,634,367
*1909...	127,731	159,918,506
1910...	181,000	213,000,000
1911...	199,319	240,770,000

Motor Trucks.

Year	Number	Wholesale Value
*1904...	411	\$946,947
*1909...	3,255	5,230,023
1903 to 1910	10,374	20,485,500
1911...	10,655	22,292,321
1912...	22,000	43,000,000
1913...	23,500	44,000,000
*1914...	25,375	45,098,464
1915...	74,000	125,800,000
1916...	90,000	157,500,000
†1917...	128,157	220,982,668
†1918...	227,250	434,168,992
1919...	316,364	423,326,621
1920...	322,039	423,756,715
1921...	154,550	166,082,000

*From U. S. Census reports.

†Production figures compiled by Automotive Products Section, War Industries Board, from sworn statements by manufacturers.

The Rubber Urge

A MIGHTY wave of desire to "ride on rubber" has been sweeping the United States during the past few years. It seems fitting to call this desire of the public a "rubber urge" in transportation. Just what the psychology is, back of this wave, and constantly increasing in size, is of less interest to the electric railway operator than the question of this influence upon his daily problem. The electric railway operator is in the transportation business. He uses steel rails and electricity as his work tools. Theoretically, he is

interested only in steel rail and electricity. Commercially and practically, however, he is in the transportation business, and the "rubber urge" is a feature of the transportation business. It effects both freight and passenger business. Motor trucks and busses are here to stay.

Their use is rapidly increasing everywhere and on every highway. They are essentially and actively an important part of the transportation business of today.

THUS, AS A transportation man the electric railway operator finds his attention centering more and more upon the problem of co-ordinating motor trucks and motor busses with his electrical operation.

Just how this may be done to best cater to public demand to "ride on rubber" is an individual problem in each particular case. No general rule can be set up which will fit any two cases.

However, this much can be stated most emphatically—motor trucks and motor busses must represent an ultimate economy or they are a distinct liability.

This question of the economy of motor trucks and motor busses, when used by electric railway companies, has too many factors for any one to offer much more than a statement of some of the operations already underway. For instance, six months ago an officer of one of the Ohio Electric Railway companies made the statement that they were not interested in motor busses. At the present time, this same company has determined that it will be economical for them to purchase, and their order has been placed for five special motor busses. These are to be operated on a highway paralleling their present lines.

Their decision was made from two angles entirely uninfluenced by the question of direct profit. In the first place, if they had not initiated bus operation covering the territory someone else would have started this service. Their franchise was in jeopardy because the public in the territory were not adequately served by the present electric service. Another factor was lack of capital to make the electric tensions, and their belief that the cost of additional track laying and equipment would be too great to prove a profitable investment at the established rate of fare.

Another company, the Northern Ohio Traction Company of Akron, found, by careful study and survey, that there was an opportunity to keep competition from their electric lines and, at the same time, operate busses at a profit by initiating two bus lines, generally paralleling their trolley service at a distance of several block of track. On one of these lines, there was already partial jitney competition, but this competition will soon be entirely eliminated by the action of the trolley company in purchasing high class motor bus equipment and by their granting transfers from bus lines to the trolley

cars.

An important factor in both these cases is also the opportunity offered by motor bus use to test the volume of traffic which may be secured, in advance of making an expensive installation. Furthermore, should it be necessary later to either abandon the lines or prove more profitable to install electric trolley operation, the motor busses will have a large salvage value or may be at once transferred to other service.

These two cases are cited particularly to illustrate that the question of economics in electric railway operation is not necessarily a question of making a specific profit on a definite installation of motor equipment.

On the other hand, there are hundreds of motor bus lines in operation in the United States in territory which was not being served by either the electric or steam companies. These hundreds of

bus lines are delivering a profit to their operators. In some cases, as in California and a few of the Middle West cities, the patronage has already proven so profitable that passenger and transfer stations have been supplied by the bus operators.

It is reasonable to assume that this business belonged to the transportation companies, either the steam or electric operators. As it is in outside hands, it is evident this transportation business was lost to the regular transportation companies largely through lack of interest in their making surveys for motor bus operation.

Several of the large electric and steam railway companies have, however, checked over their prospective fields and are now active in the business of catering to the public idea that they desire to "ride on rubber".

At Milwaukee, the Milwaukee Electric Street Railway Company made surveys which have justified their purchasing and operating 20 or more busses in co-ordination with their electric service. This action on their part has enabled them to conserve completely their investment in electric operation and to capitalize the "Rubber Urge" in making their extensions and in supplementing and supporting their normal service. In this way they have met conditions and fully satisfied the public demand for additional service.

Among the many street railway companies in the United States who have initiated bus service in co-ordination with their electric property operations are the United Electric Railways Company of Providence, R. I.; the Penn. & Ohio Electric Railway Co. of Youngstown, Ohio; the Rockford and Interurban Street Ry. Co., Rockford, Ill.; the Conn. Co., at various places in Connecticut; the Public Service Corporation of Newark, N. J.; the Street Railway Company of Baltimore, Washington, D. C., Tulsa, Okla.

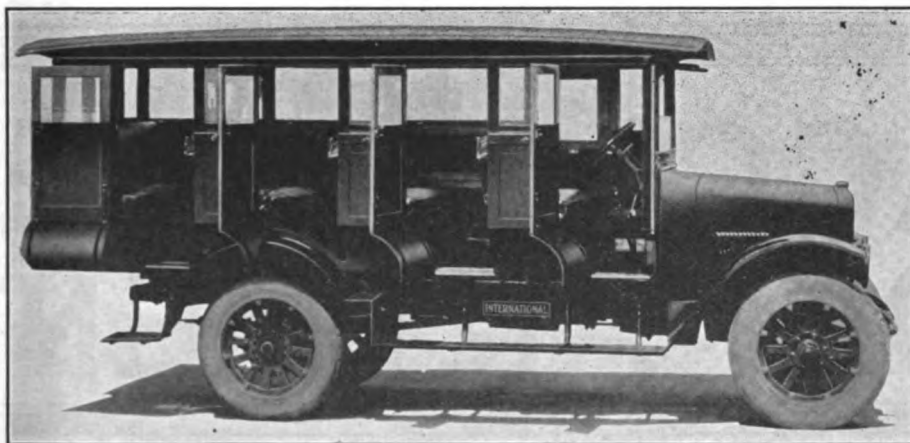
Several of the New England Companies have already initiated bus service, and in California the electric lines are both operating busses as individual companies and in cooperation and in coordination with independent bus companies in order to issue through tickets for long trips. At Niagara Falls, the Gorge R. R. Co. supplement their service by a bus operation;

(Continued on Page 390.)

28 CITIES REDUCE MOTOR VEHICLE ACCIDENTS IN 1921.

	Fatal-ities 1920	Fatal-ities 1921
Detroit, Mich.....	240	134
St. Louis, Mo.....	192	97
Akron, O.	26	13
Atlanta, Ga.	21	11
Bayonne, N. J.....	13	3
Berkeley, Cal.....	14	4
Bridgeport, Conn.....	33	21
Buffalo, N. Y.....	77	27
Cincinnati, O.....	67	64
Cleveland, O.....	120	95
Dayton, O.....	15	12
Grand Rapids, Mich..	12	11
Indianapolis, Ind.....	98	56
Lansing, Mich.....	3	2
Milwaukee, Wis.....	79	53
Minneapolis, Minn....	42	39
Newark, N. J.....	70	44
New Rochelle, N. Y....	6	3
Norfolk, Va.....	12	9
Ogden, Utah.....	1	0
Paterson, N. J.....	10	7
Peoria, Ill.....	10	7
Pittsburgh, Pa.....	..	..
Pittsfield, Mass.....	11	1
Providence, R. I.....	23	21
Richmond, Cal.....	2	1
Trenton, N. J.....	8	5
Youngstown, O.....	19	11

This Cross-Seated Bus Is Well Suited for All Kinds of Travel, But Is Especially Convenient for Use in Suburban



Work. Adults to the Number of 14 May Be Seated and 18 Children Are Easily Carried Without Crowding.

INTERNATIONAL ADDS TO LINE

MANY classes of passenger transportation will welcome the new International cross-seat bus which has just been placed in production by the International Harvester Company. It is designed and built to meet a steadily growing demand for a practical bus of this type at a reasonable price and to overcome certain objections to the conventional full length side seat bus.

The cross-seat bus is particularly well suited for suburban and inter-urban bus line and for consolidated

school service. It can be loaded and unloaded much more rapidly and gives the passengers greater comfort and a more natural position during their ride.

This bus is built with two different size bodies, with either four or five cross seats. Either body can be mounted on the 3000-pound or the 4000-pound chassis, while the smaller body is light enough for use on the speed truck chassis, as shown by the accompanying illustration.

Each seat will accommodate three or four adults, or four or five chil-

dren, which gives the four-seat bus a capacity of 10 to 14 adults or 18 children, and the five-seat bus 13 to 18 adults or 24 children.

There is an individual door at the right hand end of each seat and an extra door for the driver at his left. There is a drop window in each door and also at the left of each seat, so that the bus can be made comfortable and airy in the hot summer weather. When the windows and doors are closed the passengers as well as the driver are protected from rain or cold.

The many advantages of this type of bus can be readily seen. At the start of the trip the passengers can get aboard quickly because there are four or five doors. They also have an average of about half the distance to go inside the bus to find a seat.

The same features favor greater speed and less confusion in unloading. This is particularly true if some of the passengers want to leave the bus at intermediate points. In the cross-seat bus this is accomplished easily and quickly without inconvenience to other passengers.

Another point in favor of the cross-seat construction is the fact that the passengers all ride facing forward, which is a natural and more comfortable position. This is an advantage if the trip is long or the road rough or hilly.

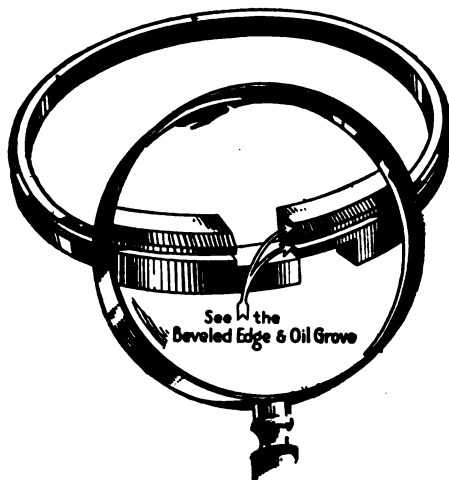
In suburban or interurban service the points mentioned are important because they add to the comfort of the passengers.

Raw Materials Used in Construction of Cars and Trucks During 1921

Iron and steel, tons.....	1,464,000
Production of iron and steel, 1921 (Iron Age).....	36,150,000
Per cent. used in manufacturing cars and trucks.....	4%
Aluminum, pounds.....	43,250,000
Production of aluminum, 1920 (American Metal Market).....	198,000,000
Per cent. used in manufacturing cars and trucks.....	22%
Copper, pounds.....	83,425,000
Production of copper, 1921 (Survey of Current Business).....	510,000,000
Per cent. used in manufacturing cars and trucks.....	16%
Tin, tons.....	12,510
Total consumption of tin, 1921 (American Metal Market).....	60,000
Per Cent. used in manufacturing cars and trucks.....	20%
Lead, tons.....	6,670
Production of lead, 1921 (American Metal Market).....	390,000
Per cent. used in manufacturing cars and trucks.....	1.7%
Nickel, pounds.....	3,400,000
Leather, upholstering, square feet.....	37,165,000
Total production of upholstering leather, 1921, estimated by the Tanner's Council at 54,000,000 square feet, but of which only 35,000,000 square feet was suitable for upholstering automobiles.	
Upholstering cloth, yards.....	5,357,000
Imitation leather, square feet.....	88,400,000
Lumber used in manufacturing cars and trucks, feet.....	313,800,000
Glass (mostly plate glass), square feet.....	16,500,000
Production of plate glass, 1921, approximately.....	55,000,000
Per cent. used in manufacturing cars and trucks.....	30%
Top and side curtain material, yards.....	15,330,000
Hair and padding, pounds.....	16,000,000
Paint and Varnish, gallons.....	5,900,000

ACCESSORIES DEPARTMENT

Universal One-Piece Piston Ring is said to overcome many of the objectionable features with which the modern gas engine is afflicted. It has found decided favor with all the motorists who have had this type of ring installed it is said, and continues to grow in popularity con-

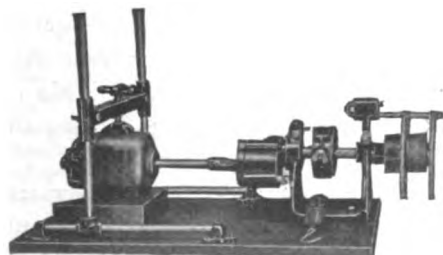


stantly. The ring is made with a bevel grooved outer top edge in which the collection of the oil takes place, the sides of this groove are sloped in such a way that the oil is wiped back between the ring and cylinder wall at each upward movement of the piston, and is forced down again on the return stroke by the square face of the ring's lower edge.

These one-piece rings are said to force the oil that is ordinarily burned in the combustion chamber back between the rings and cylinder walls, thus making it perform its full lubricating duty. A central oil groove with which the ring is fitted is said to be kept adequately filled with oil at all times. The price of these rings varies according to size, from 65 cents to \$1 each.

Manufactured by Universal Machine Company, Baltimore, Md.

Reliance Test Unit is a low priced and extremely practical machine for testing starters, generators and magnetos. This machine makes it possible for the repair



man to repair and test without going to the trouble of installing in the car each

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time a test is necessary, it is stated. The chief features of the Reliance Test Unit are low price, simple construction and general adaptability to the needs of the average shop. It has a special feature in that Ford F. A. generators mesh directly into the drive and can be turned at any angle while under test, so that adjustments can be made without removing the generator from the test unit.

The test stand has been designed under practical shop experience it is claimed to meet a demand for an inexpensive, universal drive for all makes of generators and a brake test for starters combined. The adaption of the machine to the Ford Liberty generator has been made especially easy.

Manufactured by the Reliance Battery Products Company, 2280 South Eighth Street, Council Bluffs, Ia.

Tel-Auto-Spark is an automobile instrument, about the size of a speedometer, that is said to locate trouble in the motor through a means of deduction, elimination and wireless resistance in a simple manner. The readings are easily understood it is claimed and all one needs to know about the instrument is the way it acts when there is no trouble in the motor; when different signals occur it is only necessary to look down the corners of the pages in an instruction book until the signal in the book agrees with the one on

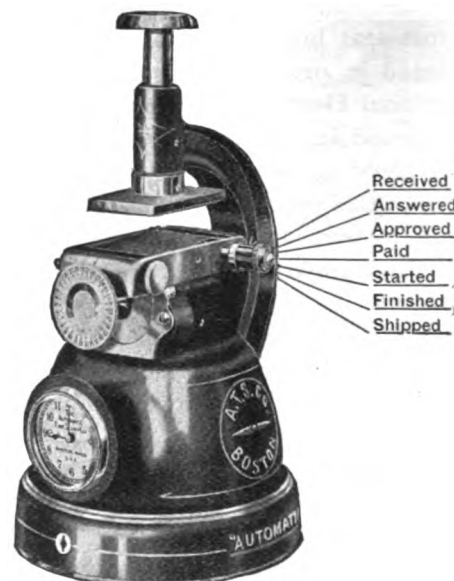


the instrument. Opposite the signal picture in the book will be found a picture of the motor with an arrow pointing out the source of trouble.

It also is claimed the device locates troubles in such a simple manner that it makes it a pleasure to keep up minor repairs. This assures a smooth running motor and enables anyone to keep the motor in perfect harmony and running tune under all conditions.

Manufactured by the Tel-Auto Spark Company, Tel-Auto Spark Building, Locust Street and Lindell Cut-Off, St. Louis, Mo.

Automatic Time Stamp is an appliance which adequately fills the needs of the modern garage and repair shop, it is said. It separates the profitable orders from the unprofitable ones and also indicates the relative competency of employees. For this purpose it may be equipped with



smaller unlettered hour and minute, or tenth and quarter hour dial dies, for starting and finishing indications of a job.

It also enables the time and date to be registered with far less effort than could be done in the ordinary way of looking at a watch or clock and then tabulating the data gathered. It is said to be very valuable in any position where an accurate time system is desired.

It can also be used to great advantage in dispensing with all arguments or questions as to just when a letter, telegram or order was received, for the exact minute is marked by passing it beneath the stamp of this automatic register. Simplicity is a feature of the mechanism of which this recorder is composed. This makes it extremely durable it is claimed and practically eliminates the danger of disarrangement.

The clock is heavily jewelled throughout and was especially designed for this particular purpose by the Seth Thomas Clock Company. It is said to be a very reliable time keeper and is connected with the time printing mechanism in such a way that it can be neither injured nor its correctness impaired by the jars of stamping, for the force of the blow is taken by the casing of the machine and not the clock.

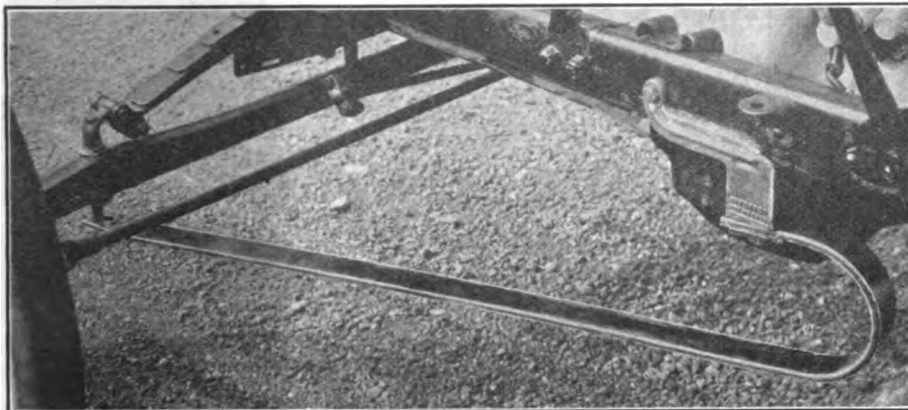
Manufactured by the Automatic Time Stamp Company, 160 Congress Street, Boston, Mass.

The Perfect Strut Rod is a device said to be meeting with decided approval by all Ford users who have placed it on their cars. It is claimed it eliminates the possibility of accident caused by the slender wishbone construction used to reinforce the Ford front axle. It is also claimed these strut rods remove the possibility of broken crank cases.

The Ford is originally built with two round rods extending from the lower side of the spring perches to a point just forward of the engine flywheel casing. It is said the entire strain which is encountered by the front axle is in this way transmit-

shift, but instead it appears to be an integral part of the machine's design. The manner in which it is applied will recommend it to many owners who refuse to drill or install devices that are not made to conform to the original design of the Ford. It is an absolute fact that removing metal from a part of any machine weakens it materially. For this reason the Perfect Strut Rod is made to fit on the Ford without drilling or machining. All that is necessary is to install the longer bolts in the holes already made in the Ford chassis.

The application of these devices has

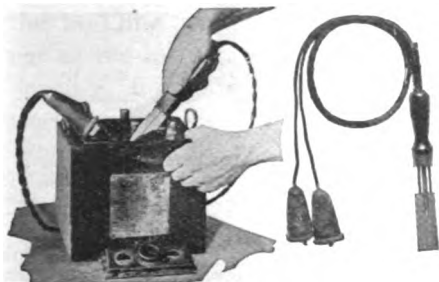


ted to the engine crankcase and many crank cases have been broken when the axle was subjected to unusually rough roads.

The application of the Perfect Strut Rod is said to prevent even the possibility of any such serious derangement which makes it a decidedly welcomed device to all the users of this make of car. The Strut rod is designed to be attached by the aid of brackets to the frame of the Ford. It is attached to the front axle and then extended back to the side channel frame of the car, where it is securely clamped and bolted, without the necessity of any machining whatever.

This device is not made like a make-

Hyrate Hot Knife may be used as a purely portable tool in the garage or on the road by connecting it temporarily to any three-cell battery by the patented connector clips furnished. If preferred the knife may be installed permanently at some location on the shop bench. With the second form of installation a three-cell storage battery should be provided. This battery should be arranged to be charged from the line or placed in series with one of the regular charging lines so



that it will be continually supplied with the current.

After connecting the knife to the battery the blade will be at the proper temperature after a few seconds, and can be used as a hot compound knife, as it is being continually heated by the current flowing through the blade. The heat generated in the blade is distributed to keep the heat concentrated in the tip of the blade. The method of using the knife is largely determined by the method of sealing used. One method is to insert the knife between the jar and cover, keeping

as near to the jar as possible. Force the knife the length of the side. Then holding the blade at an angle make another cut so as to complete a cut each side of the compound. The compound may be lifted out as the second cut progresses. In this way a maximum amount of compound may be removed with a minimum amount of melting of compound.

If the battery is so constructed that the vent barrels or posts are in the way when the knife is held at an angle, make only one cut vertically, thus separating the compound from the jar. The compound can be readily removed from the cover after the cover is out of the cell. The knife is for a six-volt battery and should never be placed across the main terminals of a 12-volt battery, nor directly connected to the lighting circuit.

Manufactured by Service Station Supply Company, Detroit, Mich.

Whitney Valve Refacing Lathe operates with complete accuracy, refacing all valves except those of extreme tungsten hardness; while the Whitney Combination Valve Reseating and Valve Port Resurfacers insure a like seat in the cylinder block, thus the work is completed with slight valve grinding, which is necessary to polish the seats.

The lathe is designed to be mounted on the bench or held in a vise and is adjustable to take any valve $\frac{1}{4}$ to $\frac{1}{2}$ inch stem diameter and valve head up to $2\frac{1}{4}$ inches in diameter, therefore its range of work is practically unlimited, pertaining to its use in the automotive field.

By lifting a gate in the top of the lathe the valve may be laid in a V chan-

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nel which acts as a guide for the valve stem, while a tension screw holding the gate against the stem allows the valve



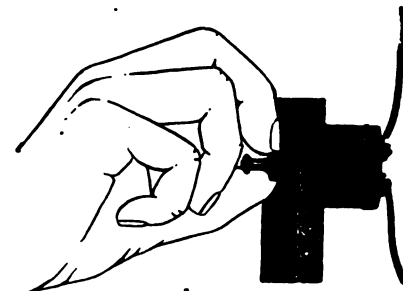
stem to be rotated freely, yet it prevents chatter and vibration or any springing or distortion of the valve while being cut. The centering adjustment or feed control is mounted on a sliding block, traveling on a guide said to insure accurate centers and even tension of the valve against the cutter. It is said the refacing of the valve is in perfect alignment with the stem, therefore a very meritorious feature of recognized importance is embodied in this tool.

The manufacturer states the lathe is substantially built, combines no complications or delicate parts and is universally adjustable to all work within reasonable bounds.

Manufactured by R. S. Whitney Manufacturing Company, 74 Nichols Street, Lewiston, Me.

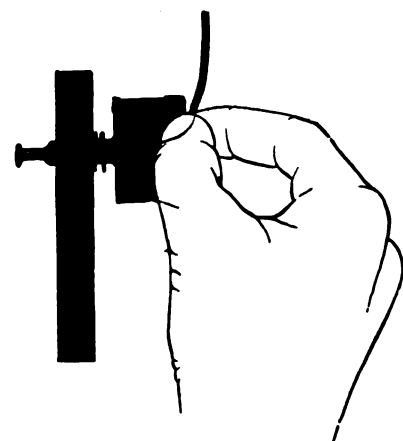
CH Utility Automobile Switch is a dash control for automobile lights, particularly courtesy and trouble lamps.

To install it only one small hole is required, $\frac{3}{8}$ -inch diameter. Through this the long threaded stem is pushed, after which the locking nut is screwed in place.



It is not necessary to drill or punch several holes and no plate is required. Adjustment of lock washers both sides of the surface on which the switch is installed, permits of securing the switch to different thicknesses of metal or wood. The installation is easy to make it is said and takes but a few minutes.

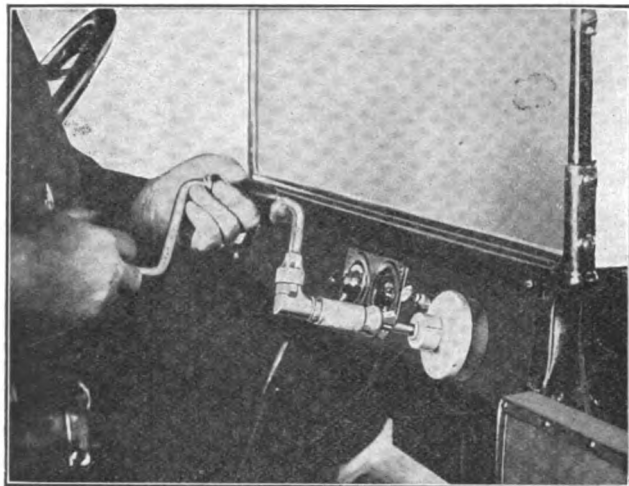
The mechanism of the switch is of the quick make-and-break type, which is not



effected by vibration of car it is stated. The operation is effected by means of a nickel plated push and pull button.

Manufactured by the Cutler-Hammer Manufacturing Company, Milwaukee, Wis.

Misener Rotary Hack Saw is a tool for cutting round holes in metal, wood and all other kinds of material. It is light, portable and so inexpensive, it is claimed,

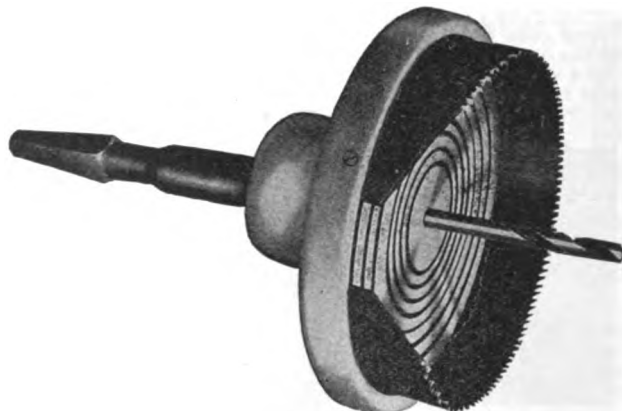


one should be in every tool kit. It is a well known fact that the cutting of large round holes in metals or other materials that have already been assembled is a

very difficult job. The rotary hack saw will save all the drilling, filing and reaming that is ordinarily done on work of this kind. When the Misener has cut

in a very short time.

Garages and service stations will find the rotary hack saw a great labor and money saver when used for cutting holes for the installation of speedometers and other instruments. By grinding worn blades to a knife edge a good gasket cutter is available. The No. 1 Misener Ro-



tary Hack Saw completely equipped with bit brace shank without blades costs \$12 net. Machine Taper Shank, \$1.90 net. Round Straight Shank, \$1.75 net.

Distributed by Robert M. Irving, Syracuse, N. Y.

Stewart-Warner Carburetor equipment for Ford cars and trucks includes a complete carbureting system of advanced design it is claimed. The mixture proportions are controlled and varied automatically and inherently in the carburetor to most nearly fit the needs of the engine, both with respect to economy of operation and the development of high power. But the full advantages of such control of the mixture proportions cannot be enjoyed unless the fuel supplied by the carburetor is vaporized before it enters the cylinders. This very important step in the preparation of the mixture is said to be taken care of by making the vaporizing chamber a part of the manifold assembly. By this means it is said the fuel is completely vaporized and then mixed with the air in the intake manifold.

Many advantages are claimed for this device, the crank case oil is not diluted and thinned out with fuel and what carbon deposit is formed in the cylinders is only that due to road dust drawn in with the air and to excess lubricating oil in the combustion spaces. Spark plugs do not foul, and hence do not require to be



cleaned. With a vaporous charge there are no irregularities of distribution, all the cylinders receive the same quality of mixture. This in itself wonderfully smooths out and sweetens the running of the engine since it makes successive impulses equal and thereby reduces engine vibration. It is claimed.

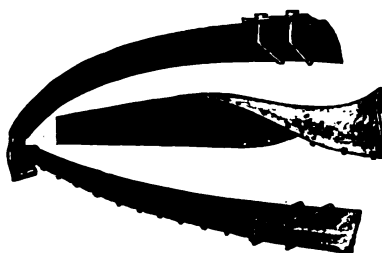
The carburetor is a simple metering device, designed to have the characteristics discussed in the foregoing, and arranged to operate effectively with the vaporizer. To secure this the throttle valve is located in the air intake of the carburetor, instead of in the mixture outlet, as is usual. Not only does this get the throttle out of the way of the fuel spray from the nozzle, so that the spray is not inter-

fered with, but it also subjects the nozzle outlet to the greatest suction or pressure drop that exists in the intake. To make best use of this great suction in spraying the fuel the nozzle is provided with a central tube, the entrance of which is free to the atmosphere. Air is thus drawn at high velocities through the air tube of the nozzle, and shortly before it leaves this passage it passes through a constriction in the tube which further increases its velocity. Just beyond this constriction the high velocity column of air picks up the fuel that is drawn out of the float chamber by the normal suction in the throat tube where the nozzle outlet stands.

Manufactured by Stewart-Warner Speedometer Corporation, Chicago, Ill.

Woodworth Adjustable Lubricating Spring Covers are said to be giving excellent service to many users.

These lace-on covers are made exactly the right size for the springs, making them very easy to put on. The covers have a felt lining which is saturated with oil when they are put on, and oil cups are provided to replenish the oil. The covers are made in two grades, an imitation leather consisting of a strong cotton backing with a genuine nitro cellulose coating which is unaffected by the action



of oil or water. They are also made of genuine grain leather of very rich appearance. The covers are held on the springs by lacing on the under side with a shoe hook and lace fastening.

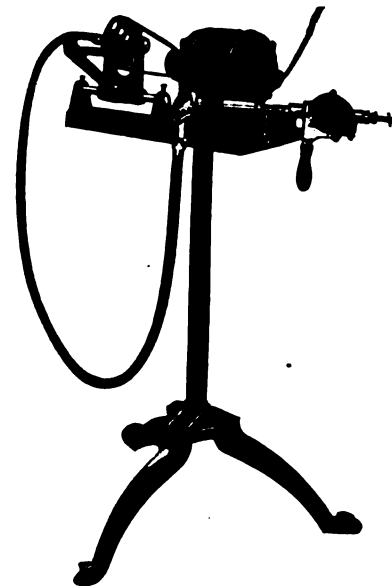
For cars with semi-elliptic springs the price of the covers is \$7.50 per set in imitation leather, or \$16 for genuine leather of very high quality. For Ford cars the price is \$2.50 per set for imitation leather or \$5 for grain leather. These covers are especially desirable for the motorist who wants freedom from spring squeaks.

Manufactured by the Woodworth Specialties Company, Binghamton, N. Y.

Sioux Flexible Shaft and Attachments make a very handy appliance for any size shop, it is said.

When used for valve grinding it has many advantages. The three-speed pulley makes it possible to adapt the correct speed to the size of the valve. Thus for larger valves you can use the low speed in order to keep the grinding compound from caking and flying off, while the higher speeds can be used for smaller valves.

The control makes it possible to stop



the grinder instantly, it is said, without shutting off the power. This feature enables the operator to lay down the grinder when he desires to clean the valve, without having to reach up and shut off the power.

The operator can take the emery wheel to the work and get into almost any place necessary. This device is especially handy in welding work for smoothing out the weld.

The tool can be driven directly by a motor, a lathe, drill press, line shaft, emery wheel stand or any other power that will drive the shaft at a speed of 1000 to 1725 revolutions per minute.

Manufactured by Albertson & Company, Incorporated, Sioux City, Iowa.

(When Writing to Advertisers, Please Mention the MOTOR TRUCK.)

White to Have New Chicago Home

AFTER 12 years in its present location, the Chicago service station and branch office of the White company will move from the premises in South Wabash and Michigan avenues to a new building now being erected at Archer avenue, Wallace street and 24th place. Newell Lyon, manager of the branch, reported yesterday that work on the new service station is being rushed to enable the company

to occupy it about the middle of September.

The removal to a section somewhat distant from automobile row was planned strictly as an efficiency move on the part of the White company; not particularly to get away from the boulevard, but to have a location that is well suited for present-day and future servicing of hundreds of Chicago delivery systems.

NOVEL surveys were made to determine the ideal location. Every customer and every known prospect was spotted on a map and it was found that if all trucks were to start for the service station simultaneously they would travel the least distance and consume the least time in going to a point very close to the Archer avenue location.

Service Manager J. T. Swigert said that plans had been made to highly develop the maintenance work in step with the growing distribution of the company's product. This will be done not through space expansion alone, but through compact operations involving new time saving methods and improved mechanical layouts. The company expects to do service work in much less time than is normally required.

The new station is of concrete, brick and steel construction, having 55,000 square feet. It is designed as a one-floor plant and nearly all of the space is to be devoted to service work, although a small section of the building on the northern corner of the lot will have two stories, housing the sales, executive and clerical offices.

The lighting arrangements are

one of the features of the plant. A large part of the wall area on the four sides of the building is occupied with windows of the studio type, while the roof areas are almost entirely of glass, letting daylight into every inch of the ship space, parts department, storage and display rooms. Even the basement housing the boiler room, cold storage, lockers and toilets will have ample daylight. A traveling crane will serve a large part of the shop space, expediting the movement of engines, axles and other heavy units.

One of the advantages of the site is the total absence of abutting buildings or land. The lot is bounded by three city streets and an alley, with an entrance and exit for trucks on Wallace street, a few steps from Archer, and two additional entrances on 24th place. All of these vehicle doorways and all interior dimensions give sufficient clearance to accommodate the largest trucks in service. Other entrances on Archer avenue give access to the parts department, general offices and display rooms.

In addition to the benefit of being more centrally located, a big advantage is expected from the loca-

tion on a main trucking thoroughfare. Archer avenue is directly connected with the loop at the present time and will soon offer an even better artery for truck traffic when the Canal street improvements are completed. In fact the strategic importance of Archer avenue from a service and traffic standpoint was clearly established.

Coincident with the announcement of the new building the company reports a volume of business greater than at any time in the past two years. April orders totaled 983 and May crossed 1000. The annual list of White fleet owners using 10 or more trucks shows a steady increase in the number of Chicago firms. Aside from its mercantile growth the product of the company is making rapid strides in public service.

REPUBLIC TO INCREASE ITS OUTPUT.

ALMA, MICH., July 12.—July is to be a month of supreme effort for the Republic Motor Truck Company, as they expect to increase their output beyond that obtained for any month in the last two years. Colonel Frank E. Smith, president of the company, declares that the farmers in Kansas and Nebraska have already started buying.



New White Company Service Station to Be Centrally Located for Convenience of Customers.

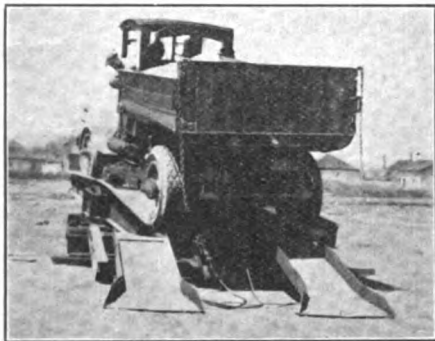
A Boon to the Road Builder

Newly Developed Device Utilizes Engine Power of Vehicle in Turning the Truck and Load Around Through an Arc of 180 Degrees in an Interval of Approximately 15 Seconds.

THE loss in time caused by the necessity of turning the motor truck around when using it in road building is frequently commented on by contractors as assuming of large proportions. To the uninformed this factor might appear to be almost negligible, but when correctly enlightened it is readily seen that there are times when this issue may have much to do with the profits of a job.

As a specific example of this loss in time the case of a contractor doing a highway construction job may be cited. If this contractor has 18 trucks at work in

this particular case the difficulty encountered in turning the trucks and backing them to the place where their load is to be dumped very often takes an average of seven minutes for each truck on every trip. If the trucks all make an average of 10 trips a day, the loss of time for one truck during that day will amount to one hour and 10 minutes and the entire fleet of 18 trucks will lose 21 hours each day in turning and backing to the point under construction. Without figuring further, the tremendous loss in time for the entire job (which often takes months to complete) is easily foreseen.



Truck and Load Being Turned on Table.

TO SAVE this waste of time and turn it into profit for the contractor a new device is being manufactured by the Champion Engineering Company, known as the Champion Automatic Turntable.

The foundation for a device of this kind, which often is subjected to a load of from 12 to 15 tons, must be absolutely solid in order to give long and satisfactory results. This has been obtained for the Champion Turntable by building the upper structure of the machine crane fashion and making the solid foundation upon which it rests of a design which successfully resists all tendency that uneven roads have to throw it off a level plane. The crane like upper structure has been designed to carry a 15-ton load with safety. This fact makes the turntable adaptable to practically all service both light and heavy.

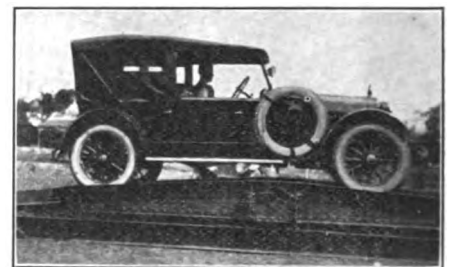
In order to convey to the reader's mind the nicety of balance and de-

sign incorporated in this machine's construction, he is asked to picture in his mind a machine that will turn a truck heavily loaded with 12 tons of crushed stone completely around in 15 seconds, without the driver leaving his seat and without the aid of manual labor from any workmen—and will just as easily handle a Ford touring car.

The turntable is designed for a maximum wheelbase of 166 inches and will operate readily on any machine having a shorter wheelbase than this. Since most trucks are manufactured with a wheelbase of 155 inches, this insures a wide scope of action for the table and makes it easily adaptable to any of the modern vehicles. The approaches to runway have approximately 30 per cent. grade, which has proven the correct amount after many extensive and actual tests have been conducted to determine the exact incline at which a convey-

ance operates best for this particular duty.

Another feature which serves to accentuate the completeness of the turntables design and also recommends it to the average contractor is its entire automatic action. The truck is driven on the table, the rear wheels engage the rollers and the table turns, the driver continues as



Touring Car as Easily Turned as Truck.

unperturbed in his seat as if the truck was travelling a nicely finished and level highway. The upper section of the device continues to revolve smoothly until the front

(Continued on Page 397.)



Table Hitched to Truck Travels Trailer Fashion When Necessary to Move.

Useful Repair Methods

Convenient Ways of Making Workmanlike Jobs on the Motor Vehicle Which Should be of Practical Value to all Persons Engaged in Truck Driving

OFTEN when dismantling a unit of the truck a screw or stud will break off short, making it difficult to remove. Generally there is not enough projecting metal to allow a good grip to be obtained with the pliers, but some-

between the radiator and water hose connection. While the leak was not dangerous or of great extent, it was corrected before going on by a connection that the reader may be glad to know about.

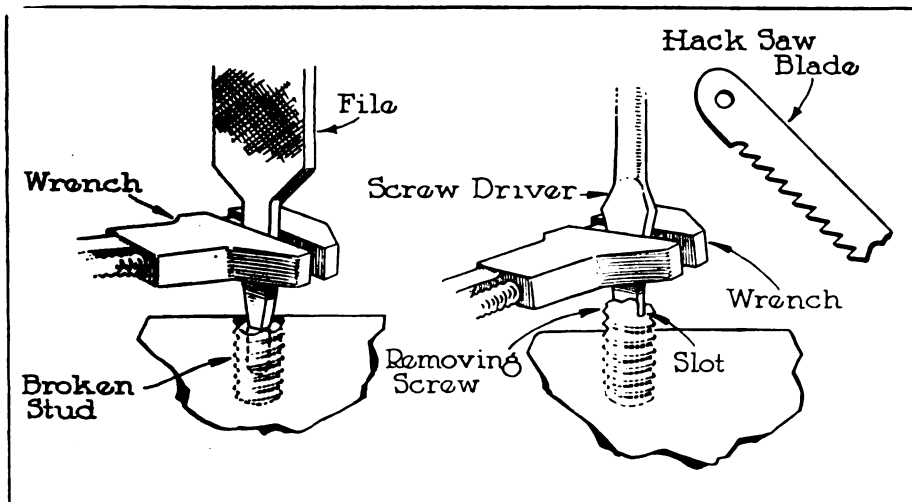
The hose clip had been tightened until

turns as may be required, always working toward the loop but keeping the turns close together. Then the long end should be passed through the bend or loop and the short end pulled to draw the bight well under the turns. The ends may then be cut off and the job will last for a long time.

Ingenious Spark Plug Terminal.

At another time, the wire to a spark plug was found broken close to the terminal and a satisfactory connection made to replace it by flattening out one end of a piece of copper tube and drilling a hole through it to fit the screw on the spark plug. The wire was then securely fastened to a $\frac{1}{8}$ in. cotter pin and securely taped. The ends of the split pin were then spread open and inserted in the short piece of copper tube, and the tube fastened to the spark plug. This made a splendid terminal, giving excellent contact and security from shaking loose.

Very often, while on long trips, numerous nuts about the chassis need tightening in order to stop a slight rattle or



Left—Using the Tang of a File to Remove Broken Screw. Right—Screw Driver Being Used to Back-Out Broken Stud After Slot Has Been Sawed in Stud.

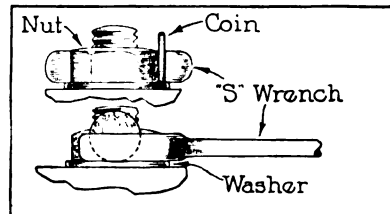
times a slot can be cut in the metal in which a screwdriver may be inserted and the screw backed out in this manner.

If there is not enough to do this, a small hole should be drilled in the center of the broken stud and the tang of a file lightly tapped into the hole. Then, by placing a wrench on the file and turn-

both ends were closed tight making it impossible to get more tension by tightening the binding screw. The clip was removed and 10 or 12 turns of insulating tape applied to the hose, then the clip was replaced and, when tightened so that the water drip was stopped, there was still more room for adjustment.

Another Good Repair.

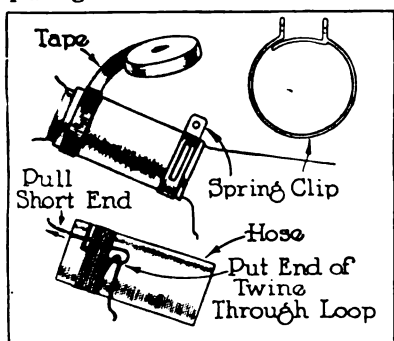
Another means, which has been used with good results when the hose clip was found broken, was the substitution of a strong twine to bind the hose, such as is used in fishing. It is better than wire, and when wound on neatly and secured without a knot by underlaying the ends, it makes a real workmanship job. In applying the cord, take about five feet, double it like a hairpin approximately six inches from one end and lay it on the hose. Then take the first round turn about two inches from the bend and draw up tight, following with as many



A Solid Wrench Can Be Often Made a Fit for a Smaller Nut by Using a Coin.

squeak. If the nut happens to be in an inaccessible position, it will be found necessary to use an open end "S" wrench to accomplish the job. If it happens (and it often does) that no "S" wrench of the proper size is carried in the tool-kit, many motorists use the next size larger wrench, which barely catches on the corner of the nut. The result of such a procedure is a badly battered and rounded nut. Instead, use the next size larger wrench, but pack it up on one side with a nickel, a dime, or a

(Continued on Page 388.)

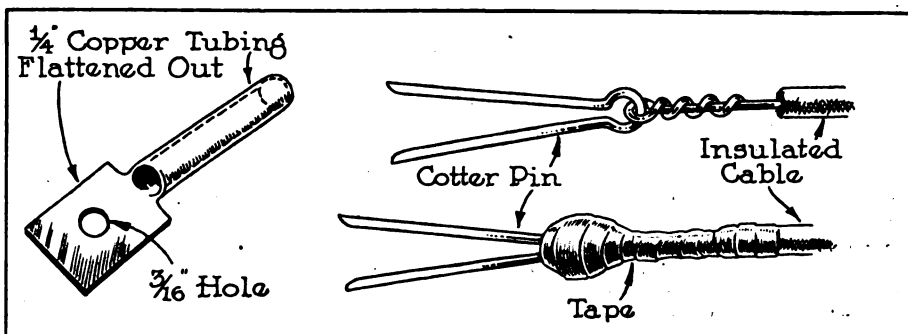


Two Methods Which Can Be Used in Stopping Water Leaks at Hose Connections.

ing it, the screw usually is removed. Another method may also be used if facilities are at hand. If the stud to be removed is right hand threaded and a small left hand tap is available, the center of the broken stud may be drilled out to the tap size and the hole threaded (with the left hand tap) which, on being screwed up tight, will back out the broken stud.

Emergency Hose Repair.

The writer at one time was on a Sunday trip to Buzzards Bay, and, while stopping for gas, noticed a water leak



A Terminal Which Will Give Very Satisfactory Service Can Be Made from a Small Piece of Copper Tube and a Cotter Pin.

Servicing Tractors a Profitable Business

NEARLY every farm manufacturer has had experience with the demands of owners for service. The character of these demands depends, of course, upon the representations made by salesmen to buyers, but as a rule statements made were reasonably

conservative because the dealers were dealing with established trade, with men with whom they had had business relations for varying periods of time, and continuance of these relations could not be expected unless the customers were satisfied they were fairly dealt with.

IN OTHER WORDS, the buyers were reasonably confident they could depend upon the dealers to afford them satisfaction, believing that they in turn would be protected by the manufacturers. Farm implements, especially those drawn by animals, may be regarded as standardized products, made in large volume, sold in competition and good value for the prices. Such implements were made of fairly enduring metal and were practically operative, but many of the parts were cast of malleable iron, the machining was minimized and the fitting was to limits that were believed sufficient for implement work.

In many instances, the bolts, nuts and screws were what might be purchased in any hardware store, and, aside from replacement of broken parts, one or two adjustable wrenches and a screw driver were all the tools required. Stock bolts and screws were comparatively inexpensive and practically no mechanical knowledge was necessary to do whatever was required for ordinary maintenance or replacement. The hardware store was one source of supply and the average dealer carried sufficient stock of spares to renew parts.

Such implements were provided with oil holes in the castings, in some instances, with grease cups and rarely were the moving parts protected from dust and abrasives. The possibilities from lessening wear were not sufficient in the minds of the manufacturers to justify the additional cost that would be entailed were provision made for insuring continuous lubrication.

Tractors Are Built by Skilled Men.

But the development of tractors necessitated many changes in manufacturing methods and far closer work, until today the well designed and built machine is constructed as carefully as an automobile, truck or marine engine; material is equal in quality and the workmanship fully as close. The finish need not be as good. A forging, for instance, that is protected by paint will serve quite as well as one that has been filed, ground or polished, providing that machining is accurate and the fit of all components exact. The work must be not only perfect, but the quality must be extremely high grade, for the tractor or power implement must endure far harder service than the car or truck, and the material must be of the best.

Obviously, the adjustments should be carefully made and the exact relations of the components be maintained. Instead of work that could be done by the owner or hired man, there is need of the skilled mechanic, who not only knows internal explosion engines and their auxiliaries, but is capable of working metals closely and accurately. Unless a tractor is well

kept, mechanically, the owner is the loser, and rarely does an owner have the training and experience that qualifies him to do anything more than the oiling, greasing, cleaning and tightening of the nuts and bolts and adjustment of the carburetor and the ignition system that are described in the instruction book.

Maintenance Must Be by Experienced Men.

This means that the owner must depend upon service stations for work that he cannot do himself, and, if he hires a driver, this man's experience may be limited to minor repairs. Many men who drive tractors well are not sufficiently skilled as mechanics to justify letting them do repair work on them. The average owner may believe that he is economical if he can do his own work, but, while this angle is practical enough, there is the other aspect—the value of the economy does not compensate for the deterioration of the tractor. Again, there is the factor, neglect, which may run into money rapidly.

Opportunities for Tractor Service.

The average rural commercial center may not have a large population, but it may be of considerable importance to those operating farms. There may not be a sufficient number of residents to make an automobile service station a profitable enterprise, though a repairer might be to a greater or less degree dependent upon transient patronage, but a man who has good mechanical skill and will devote himself to servicing tractors and power farm implements can develop a business that will be constantly productive. There is, apparently no reason why it should not increase annually.

This fact leads to the conclusion that there are excellent possibilities for implement dealers establishing service stations, or to have their servicing done by practical men, and, if these stations or shops are operated according to the standards of the manufacturers, the tractor and implement owners will be able to have quick and efficient attention.

Establishing Shops Can Develop Custom.

The average blacksmith shop has some of the equipment that is necessary for a tractor service station. There are apparently good opportunities for enterprising blacksmiths to engage in service work. As a rule they are known and their customers are located within what might be defined as animal driving distance, but there is no reason why they could not attract business within a radius of from 20 to 30 miles. The blacksmith and tractor service man could, in combination, develop excellent patronage. The automobile repairer taking up tractor and farm implement servicing would have knowledge of engines, carburetors

and ignition system, but he would have to understand tractors to be successful in this work.

Tractor service differs from that afforded to car and truck owners in that the machines cannot be moved quickly, and, if not in condition for operation, the worker must go to them, which means that the mechanic must have means of conveying himself and his tools and materials to and from farms. The distances may be short or long, and unless the exact condition of the machines are known, and condition can only be judged from the statements of the owners, a general assortment of tools and such material as might be used must be carried. This can only be done with a light truck, which must be equipped for such work. Farm Work Necessitates Different Work.

The worker will find that repairing a tractor in an owner's shed without power or good light or any of the power tools that are used in the shop will be an entirely different proposition than working in a station. The mechanic must be resourceful and he must have experience himself, and, unless he has specific knowledge of a machine, he must work because he is entirely dependent upon to a plan of elimination and more or less experimentation until he has made the restoration.

There is more or less work that will follow mechanical practice and which can be done with reasonable certainty, but no man can obtain a specified result on a machine that is unknown as quickly as on one that is known. The second machine, worked on the time for a given job, will be considerably reduced and the work will be better done.

Work Must Give Satisfaction.

But the tractor service must be thorough and it must be for the lowest charge that is consistent with time necessary for it. The station must charge for the use of the machine that conveyed the worker to the farm, for the labor and the material and supplies. If the cost is excessive, the service man is condemned by the owner and criticised by the manufacturer and distributor. Unless it is sufficient, the service cannot be continued. The matter of parts is not important, for the owner knows the prices from the parts catalog, and he can be assured that reasonable adjustment will be made in the event the responsibility for breakage or failure is established as the manufacturer's.

There is no question, however, that the service will depend in large measure upon the delivery of parts that can be made by the factory, distributor or dealer to the owner. The service station may make contract that will insure dependable sources of supply that will be sufficient for whatever demand that may

be made upon it, and from every viewpoint, the manufacturer, distributor dealer, owner and service man will be organized, so that each will practically benefit. The business that each service station can develop is largely dependent upon the satisfaction that it can afford.

Must Have Co-operation of the Industry.

There is no reason to expect that any service station owner can operate successfully without the co-operation of the other interests, nor is it possible to engage in business where there are very few tractors. There is, however, the best of foundation for the statement that the manufacturer can very practically develop his service with his sales organization for good service is a very potent factor with buyers, and the servicing can be made attractive to men who are now established, are known, are responsible, and who add considerable strength to the sales force.

One very practical reason why the car or truck or general service station in a city or town of considerable size cannot be expected to engage in tractor service is that the machines are not as yet sufficiently numerous in any community to warrant exclusive work, and they are so widely scattered and the cost of servicing them so excessive that there is not profit for the station, and, if regular charges for labor and time of conveyance are made the owners believe they are subjects for extortion.

The tractor service stations now operated are comparatively few. There may be belief that exclusive tractor servicing will not be profitable. But the practical possibilities have been pointed out, and shops now established can consistently and profitably engage in this work.

GERMAN AUTOMOTIVE INDUSTRY RECOVERING RAPIDLY.

WASHINGTON, July 10.—The growth of the German automotive industry to such an extent as to compare favorably with pre-war production, marks this branch as one of the healthier enterprises in Germany at this time, says Assistant Trade Commissioner Daugherty, Berlin, in a report to the Automotive Division of the Department of Commerce.

The passenger car registration in Germany on July 1, 1921, was equal to that of 1914, when over 60,000 cars were in use as compared to 52,000 registered on February 1, 1920. Much has been said of the superiority of German passenger cars before the war, but complaint has been heard from post-war foreign buyers that the pre-war efficiency of the high grade German car has not been maintained. Some prominent manufacturers are reported to be building "for export only" a better car than is sold the inland buyers. Germany thus seems to be striving hard to get a footing in foreign markets.

The better known makes of German passenger cars in the probable order of their worth are: Mercedes, Benz, Opel, Wanderer, Audi, Horch, N.A.G., Protos, A.G.A., N. S. U., Stoewer, Presto, Dixi,

Simson, and Elite.

The growing demand for the motor truck in Germany is the direct result of its adoption by agriculture and industry. The present registration of 30,424 is over a 300 per cent. increase over that of 1914. Another factor lending stimulus to the use of the motor truck as a carrier is seen in the rapid increases of freight rates on German railways, which tend to make transportation by truck cheaper than by rail, despite the continuing price increases of motor trucks, accessories and motor fuel. German firms have been able to transport merchandise from Hamburg to Bremen by motor truck at a 10 per cent. saving in cost as compared to railway transportation. In addition, 3 to 4 days were saved in the loading, transit, and delivery to ship's side, or to other receiver, besides the cost of transit from freight yard to ship.

The motor truck has been of great service to the "Technische Nothilfe," the well-known "Emergency Aid Service," in breaking railway strikes. During the general railway strike in February, 1922, this service ran a schedule between Berlin and Hamburg, carrying mails to Hamburg and food to Berlin.

Business in motor trucks was so heavy last year that manufacturers were behind in their orders, the 1 and 2 ton trucks being the most in demand with the 4 and 5 ton truck second, while the 3 ton trucks were not popular at all. The inability to deliver promptly, coupled with rising prices, created a demand for used cars.

The most popular trucks are Krupp, Buessing, M.A.N., and material, N.A.G., Daimler, Benz-Gaggenau, Stoewer, Adler, Bergmann, Hanna Lloyd, Horch, Mannesmann-Nulag, Nuerberger Hercules Werke, Vomag, Dixi, Faun, Duerkopf and Daag.

GENERAL MOTORS REPRESENTATIVES GO ABROAD.

NEW YORK, July 8.—Among the passengers on the *Majestic*, which sailed today, were John J. Raskob, chairman finance committee of General Motors Corporation, and A. H. Swayne, vice president of General Motors Corporation in charge of relation with banks.

Mr. Raskob will visit London and Paris and Mr. Swayne will in addition go to Germany and Austria. While their trip is in the nature of a vacation they will also look after interests of General Motors in Great Britain and on the continent.

OIL.

PITTSBURGH, July 9.—Imports of petroleum, crude and refined oils, at principal United States ports for the week ended June 10, totaled 2,996,212 barrels, according to figures collected by the American Petroleum Institute. This was a daily average of 413,745 barrels, and compared with a total of 2,996,505 barrels for the week ended June 3.

Receipts at Atlantic coast ports for the week ended June 10 were 1,301,212 barrels, a daily average of 185,888 barrels.

HAS MORE MOTOR LINES THAN RAILWAYS.

TURIN, ITALY, July 10.—Italy possesses, without including Trentino and other recently annexed territories, 21,000 kilometers of public automobile lines subsidized by the government, as compared to 15,000 kilometers of railways throughout the kingdom, according to Consul Sycks of this city.

In addition, 525 of the above lines are connected with private lines operating without a government subsidy, but under state control. Since the armistice 200 new concessions have been granted, covering 6000 kilometers. The government has also aided the establishment of public lines in Trentino by selling war materials and over 400 cars to the companies at reduced prices.

In view of the further need for motor transportation, many companies now operating lines and many communes throughout Italy are urging the government to take steps for the promotion of additional lines to connect the many communes which cannot be reached by railways, to the more important railway centers. It is claimed that commerce in many sections would be increased by the new lines, which could be assisted by government appropriations, and exemption from numerous taxes until well established.

SHIPPING BY TRUCK IS ECONOMICAL.

NEW YORK, July 11.—Officials of many haulage concerns laid particular stress on the fact that the motor truck had long passed the experimental stage and was now an important aid to the various shippers. John H. Jacobs of the Eagle Motor Haulage Company states that if any difference exists between motor truck and express transportation, it is greatly in favor of the former and that a comparison between railroad tariffs and truck haulage, including the drayage at each terminus, shows them about on a par.

"The express tariff between New York and Philadelphia is \$1.46 a hundred pounds," states Jacobs. "The motor truck rate is \$1. The first class rail rate at present is 46 cents. Add to this 10 cents a hundred at each terminal for drayage and we figure 66 cents. The average motor truck tariff for lots comprising five tons or more is 65 cents. Furthermore, this takes no consideration of the many advantages gained by truck haulage over the other kinds."

ADDS ANOTHER OVERLAND BUS LINE.

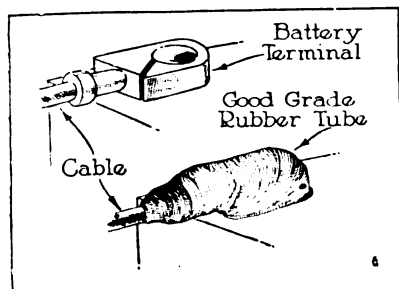
LOS ANGELES, CAL., July 11.—A new line offering automotive transportation from Los Angeles to Kansas City has been started by the Overland Motor Bus Stage Company of this city. The buses travel over the Santa Fe Trail and cover practically the same territory from these points as the old "Pony Express" did in bygone days. A. M. King has direct supervision of the line, it is stated.

(Continued from Page 385.)

penny. This will cause the wrench to closely hold the nut in its jaws and will prevent damage to the flats on the nut.

Corroded Battery Terminals.

Very often motorists are troubled from short circuits at the battery terminals.



Covering Battery Terminals Aids in Protection from Corrosion or Short Circuits.

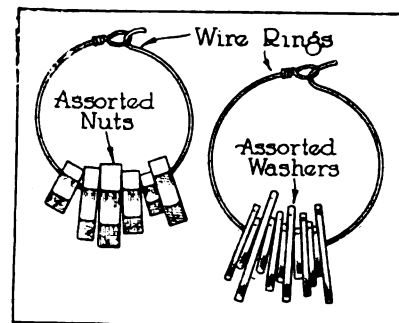
This may be prevented and the terminals protected against corrosion if the wiring is removed from them, and a piece of rubber tubing slid over the cable insulation before the terminals are replaced. This rubber tubing should just fit the outside of the cable. The connections then should be remade and the rubber cable pulled down over the entire connection, thus protecting all the metal parts.

Repairing Punctured Tank.

The way in which a gasoline supply tank (that had been punctured by a stone while on the road) was mended while away from the shop by a garage man should prove interesting to all mechanics.

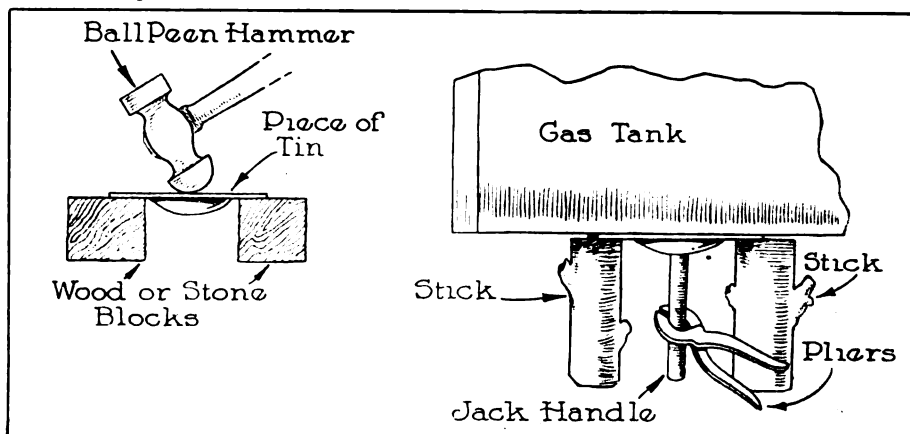
First, the tank was thoroughly aired out by using the tire pump to blow out any fumes which might be present.

Second, the top of a baking-powder can was found in a dump near the side of the road. This was formed into a saucer shape by using the ball peen of a hammer. A fire was built on the side of the road over which the saucer shaped tin was held with a pair of pliers, to which a green stick that would not burn had been fastened. A small piece of solder, which fortunately was found in the tool-kit, was placed in the tin and melted. The point at which the puncture had occurred was thoroughly cleaned and some flux applied around the surface. The detachable handle of the car jack was then heated in the fire. When it had gotten red-hot, the saucer shaped tin was placed underneath covering the puncture, being held up in this position by the two pieces of wood. The heated bar was next placed against the patch and held in position for several minutes.



Nuts and Washers Should Be Strung on a Small Wire and Ends Looped Together.

This procedure caused the solder to melt again and adhere to the tank. After the entire patch had cooled, the two supporting rods were removed and the job proved to be thoroughly reliable.



Repairing a Punctured Gasoline Tank May Be Accomplished by Using a Piece of Tin, Blocks of Wood, the Jack Handle and a Pair of Pliers.

RESTRICTION OF RUBBER OUTPUT EXPECTED.

At a recent meeting of the International Rubber Growers' Association the matter concerning the restriction of the rubber output in the Dutch Indies was discussed and resolutions were passed which may seriously affect American rubber interests in the Dutch Indies, where many large estates are owned by American tire factories.

The Dutch rubber growers and the British growers have agreed to cooperate in an endeavor to restrict the rubber output in order to improve the market prices. For the purpose of withholding 100,000 tons of surplus rubber from the market, the resolution was passed at the request of the government to form an organization of growers who could make this an accomplished fact.

ORGANIZE THE SPARTAN RUBBER COMPANY.

Articles of Incorporation have recently been filed under the laws of New Jersey by the interests which took over the defunct Zee Zee Rubber Company's plant at Yardville, N. J. The new firm will be known as the Spartan Rubber Company and will manufacture high grade tires and tubes, which will be called the Spartan Armor Tread cord tires and the Spartan tubes.

The officers of the new company are: Arthur Newman, president; Edward D. Newman, vice president and secretary, and Stanley Newman, treasurer. All these men are well known business men of New York City.

Work has already started, it is said, making the necessary changes for capacity production. From the day it opens it will be operated day and night with either two 10-hour shifts or three eight-hour shifts. Carl Kavenagh, now production manager of the factory of the Ajax Rubber Company, is to be plant superintendent and a force of about 200 men will be hired to work under him.

DANGER OF SURPLUS IN TIRE PRODUCTION.

The opinion was expressed by Harvey S. Firestone, president of the Firestone Tire & Rubber Company, Akron, O., that there was great danger of an overproduction of tires in the United States. In fact he claims the surplus exists at the present time in many sizes, although a great many of these tires will probably be sold by the end of the month. Mr. Firestone is quoted as saying, "Our information shows that there is a large overproduction of tires now in many types and sizes. In fact demand all along the line has hardly kept pace with the production and as a consequence a surplus has been building up. It is expected that the usual increase in trade sales

during the coming month will absorb this surplus and I hope this will enable the rubber industry to maintain its present production schedule late into the year. From a general business viewpoint there is reason for optimism, but we feel we must view the improvement sensibly and proceed with caution."

It is estimated that there are about 85,000 tires turned out each day in Akron, and no immediate reduction of this number is expected, owing to the influx of summer orders.

RUBBER COMPANY PUTS ON NIGHT SHIFT.

The Studebaker-Wulff Rubber Company of Marion, O., recently put on a night shift, due to an increasing demand for their product. B. F. Wulff, general manager of the company, stated that this action was necessary because of the prompt sale of the daily tire output which prevented the forming of a surplus stock.

SALES OF THE KELLY-SPRINGFIELD JUMP.

Announcement was made recently that in the first six months of this year the Kelly-Springfield Tire Company had sold more of its product than during the entire year of 1921. It is also asserted that the plants at Akron, O., and at Cumberland, Md., are working at full capacity.

Protection of Highways

(By JOHN N. MACKALL, Chairman and Chief Engineer of the Maryland State Road Commission.*)

MR. CHAIRMAN and Gentlemen, when I get with technical people I am embarrassed to death. Ever since I have been here they have been talking about my paper. I have no paper but this programme, and it does not tell us very much.

I am glad of an opportunity to present to you gentlemen and ladies, who are interested in the preservation of our highways, some of the experiences and some of the reflections which we have had upon that subject, which we believe is of vital interest to every man, to every woman and to every child, and one which unfortunately seems to be nobody's business.

I am going to sketch briefly for you, in order that I may develop what I have to say, the highway system as it has been developed in the State of Maryland. I ask you to pardon the personal references to the highway system of Maryland. I assure you it is no choice of mine, and it is a system with which I have unfortunately had very little to do, so I can sketch that system to illustrate a point without too much personality.

WE HAVE in Maryland a total of about 15,000 miles of public roads. We have improved about 1700 miles of that 15,000. Those of you who are quick at figures will make that to be 12 or 13 per cent. It has a portion of improved roads in percentage second to no state in the Union. The condition in which they are maintained is second to no state in the Union, and the service which they are rendering to the public is second to no state in the Union.

There was talk in Congress a year or two ago about a Federal system of highways, to which the Federal government would contribute a certain percentage of the cost. A bill was drawn providing for a maximum of seven per cent., constituting a system of roads, of which three per cent. was to be the primary system and four per cent. the secondary system. I cite you that, gentlemen, to show you that the percentage of improved roads in the United States is very, very small. Taking the approved types, the percentage is no more than two or at the most three per cent. of the road mileage in the country are improved roads. Then it simply behooves us to protect for as long a time as we can those highways which are rendering and are capable of rendering satisfactory service. And I ask you, gentlemen, each of you, do you believe that is being done? Do you believe in the community from

which you come that everything is being done to conserve the system of highways or the improved highways or these semi-improved highways as they exist?

But have not we taken up and helped to carry on the propaganda put forth by the professional propagandists in believing that roads means new roads, not old roads, not good roads, not usable roads, not serviceable roads, but new roads.

I attended downtown this morning a conference of the motor vehicle manufacturers and highway officials. They had been in conference a couple of days before I got here, and the whole thought is financing, getting money enough, to build a system of roads, the most laudable ambition in the world, to build a system of roads.

But after all is the public interested in the type of road you build, or the width of road you build, or the kind of road you build, except you build them a serviceable road and one that can be used every day in the year? I maintain the public is not interested at all whether your road is concrete or macadam or asphalt, or what not, but it is interested in a road which they can use with safety and comfort every day in the year.

I maintain, gentlemen, there are many miles of road which could at small expense be made to meet with specifications which are being destroyed in order that we may build more roads.

And why do we build more roads?

Because we have been completely imbued with the idea that only a new road is a good road, one that has just been built. One of the largest producers of a commodity entering into so-called good roads started the slogan a few years ago, "Build the road to carry the load." You could not find fault with that. Fine! "Build the road to carry the load." What load? Any load that unscrupulous manufacturer may want to put upon it. I heard the distinguished speaker before me speak about crooks, and it gave me an inspiration—any crook who wants to make the public pay a dollar in order that he may save a penny—any load of any size he may want to put upon the highways.

I maintain, gentlemen, that the system of roads we have are as they are today because we have been sold by the man whose business is to sell an idea. We maintain here in Washington perhaps more propagandists than any place in the world—certainly greater than in any place I have ever seen them—high grade men, paid high salaries, to sell to you and to sell to me the idea that we must go out and build more roads—to carry the load.

I started in my little way and it was less than I thought, to combat that propaganda, to build the road to carry the load. I asked this manufacturer if he would not substitute for that, "Limit the load to one that the road will carry." "No; it does not sell our commodity. I am not

(Continued on Page 403.)

*Address to the National Conference on Weights and Measures at the 15th Annual Meeting held at the Bureau of Standards, Washington, D. C.

(Continued from Page 378.)

the Escanaba, (Michigan) Power and Traction Company, and the Northern Texas Traction Company of Fort Worth are also now on list of users of both electric and gas motor bus transportation. At San Francisco and Seattle, the Municipal Companies are co-ordinating both types of service in carrying passengers. As an evidence of the very rapid increase in the use of motor busses throughout the United States and in support of the statement that the public are enthused over the flexibility, convenience, economy and utility of the motor bus, it is most interesting to cite the fact that one manufacturer of busses has received orders for over 350 of a new model which was first announced to the electric railway and motor bus operators on January 1st, 1922.

As transportation men, the electric railway operators will, undoubtedly, be much interested and possibly quite surprised to know that an independent bus operator, Frank Martz, of Plymouth, Pa., carried more passengers per bus in 23 busses, which he operated in Wilkesbarre, Pa., in 1921, than were carried by the same number (23) of the busses operating on the Fifth Avenue Line in New York City. The figures are: For Wilkesbarre, 183,891 passengers per bus—for New York City, 174,192 passengers per bus. In fact, the total passengers carried by Mr. Martz in the busses which he operates in Wilkesbarre, Pa. territory was well in excess of 4,000,000 passengers carried during 1921. Mr. Martz began hauling passengers in and about Plymouth, Pa., in 1910, and he reports that several of his busses have passed the 300,000 mile travel mark, that 8 have run more than 200,000 miles and that 20 have run more than 100,000 miles each.

Throughout the United States there are dozens of these independent bus operating companies which have had a period of existence amply justifying the statement that motor bus operation is an economic transportation.

Mention should also be made of the rapidly increasing use of motor busses of special type to transport vacationists, tourists and business men into scenic and resort territory previously inaccessible on account of the expense of establishing either electric or steam transportation on account of physical contours of the country and the season feature of the traffic.

Motor busses may be driven over inexpensive highways into hilly territory serving seasonal traffic and transferred to other territory at will. This frequently makes an operation very profitable through using these busses in service in the North in summer and in the South in winter.

Last year on a trip from Chicago to the Pacific Coast the most impressive single feature of the entire distance was the ever present motor traffic.

Whether we went west along the well known routes of travel or toured as we did, into the very interior of Utah, in one case going to the north Rim of the Grand Canyon, 202 miles by highway away from railroad, there was always motorized traffic passing in both directions, citizens in passenger cars, motor trucks, and mo-

10,448,632 CARS AND TRUCKS IN 1921.*

Motor Vehicles Produced, 1,668,550
 Number cars..... 1,514,000
 Number trucks..... 154,550
 Decrease from 1920.. 24%

Wholesale Value 1921 Output,
 \$2,212,068,420.

Value complete car and truck output\$1,260,000,000
 Value of parts and accessories output 409,710,000
 Value of tire replacements 542,358,420

Motor Vehicle Mfg. Business.
 Capital invested..\$1,423,500,000
 Cost of material bought 1,058,230,000
 No. of employees. 186,000
 Wages and salaries 299,098,780

Tire and Fuel Figures.
 Gasoline produced, gallons5,153,549,318
 Gasoline consumed, gallons4,516,012,979
 Tire casings produced 27,275,000

*Gain of 13% Over 1920.

tor busses.

There were cars from almost every state in the Union, and motor trucks carrying almost everything conceivable from live stock to miscellaneous merchandise. Certainly no one thing could more emphatically demonstrate the fact that we are in the process of motorizing our highways, and that the "rubber" transportation of today is a new economic force in this service.

When we arrived in California, the traffic increased tremendously, motor trucks and motor busses operating everywhere, in addition to the thousands of passenger cars, further compelling recognition of the value of good roads in this process of motorization.

With the thought in mind that motor vehicles have been in successful operation and on an economic basis for such a short while at best, less than a period of one generation—it is difficult to fully realize the great revolution which has come in our highway transport.

Our steam railway and our electric railway operations have been largely revolutionized during this same period through the development of the several types of motive forces. The application of these same power forces to industry, electricity, steam and gas has changed our entire country from a manual institution into a mechanical institution.

In a measure, motorization of our highways is likewise a change from a manual to a mechanical method of highway transport. Until the advent of the motor vehicle, there had been very little progress made in the type of road vehicle in use since the days of Roman road and Roman horse drawn chariots. What little progress had been made was merely in the character of the load car-

rying device. The motive force was still physical power and not mechanical.

With almost 11,000,000 motor vehicles already on our highways, it will be just a short time until all individual highway transport will be by motor.

This is the logical step for this generation. It is the absolutely necessary step in the evolution of mankind. The steam railways and the electric railways will reap a return ultimately from this motorization as it will tend to still more closely knit the country into a corporate economic unit to promote quick exchange and rapid interchange.

While at the present moment in some isolated instances the advent of the Motor truck and the Motor bus may seem to initiate a new competitive unit and, ultimately there may be members of lines of steam, electric and motor busses serving in the same community—the Motorized vehicle will always be used for a type of economic transportation which, in general, is not competitive with either steam or electric operation.

It is an important fact that the motor on the highway offers the opportunity to supply the public with both local and express service operating over the same route, while this is impossible on single line rail.

It is very probable that a great many electric railway companies could profitably operate bus lines paralleling their rails, especially in congested centres, operating the bus lines for express service and using the electric service almost entirely for local stops. In many cities, it would be possible to secure ten (10) cent fare rates for such improvement in service, and thus turn into a very profitable operation a franchise which carried so much long haul traffic as to be otherwise unprofitable at the usual five (5) cent fare rate.

In other cases such a service might solve a rush hour congestion problem profitably where the addition of extra cars would only tend to slow up movement and increase congestion.

Another field for the use of busses in conjunction with electric line operation is in territory where development has spread the area served until a large percentage of possible short haul passenger business is lost on account of the distance the passenger must initially walk to reach the trolley.

The use of busses covering such a section over what might be called a curved or bow route paralleling the trolley service at some distance, but not operating on exact trolley schedule, would often prove distinctly profitable and preserve the existing company from possible competition.

The picking up and delivery at curb, whether in urban or in congested city territory, is a psychological element to consider in the opportunity to increase short haul traffic.

As previously stated, an interesting phase of the great increase in the use of the motor bus is that the public have, through their ownership of motor cars, been educated to "Ride on Rubber". Probably this as much as anything else is the real reason why men, women and children will jam into and overcrowd the "Jitney" and seem to prefer it in many

cases as a means of transportation, even in places where the "Jitney" service is paralleled by the electric railway.

It is largely the public who do not own cars that prefer the "Jitney". It seems to be a vehicle of which the rider is more intimately a partner than in the trolley. The psychology of the entire situation is a vital factor. This is the "urge" back of the increasing use of busses.

In the motorization of our highways, the Motor Truck has been ranking next to the passenger car in importance up to the present time, but it is very probable the use of the motor bus will soon exceed even the use of the truck in the revolutionizing of our highway transport.

In this, it is very pertinent to comment on the subject of agitation in some sections to have the motor vehicle more heavily taxed.

Fundamentally, this is moving in the wrong direction, except so far as all vehicles using the highways may be taxed in proportion to their proper share of maintenance. As figures given later will show, this is already accomplished.

The motorization of our highways is itself the economic force which has compelled the betterment of our highways, and, to increase taxation of this special class group, would seem to tend to drive backward instead of forward.

While the motor vehicle automatically demands good roads and the use of motor vehicles increases in proportion to the improvement in the mileage of good roads, the all important point is that the mass citizenship are bettered by the improvement of roads, as it is an old adage that civilization and development follow improvement of transportation facilities.

Even the interests of the steam and electric roads may ultimately be served better by low taxation of motor vehicles than by high taxation. The steel rail carriers, both steam and electric, are the transportation industry. Sooner or later they will own and operate their own motor truck and motor bus lines, probably using trucks very extensively in store door delivery which is beginning to be demanded by merchants and wholesalers; and motor busses for the economic handling of their short haul and local passenger business, and to supplement and probably in many congested districts to support or supplant already established lines.

In fact, as there are now dozens of electric railways and steam railway companies, who own and operate both motor trucks and busses, they are just as much interested and will be more interested in the future in keeping down the taxation on motor vehicles as will the makers of motor equipment.

For this reason, it seems fitting that all transportation interests—the electric railway and steam interests, as well as the motor interests, can well refrain from agitating for taxation which may ultimately tend to become a boomerang tax, and thus, prove burdensome to their own operations. Especially is highway tax agitation futile when it merely tends to widen the transportation cost breach existing between consumer and producer, and as well to reduce the volume of goods which may be transported by motor

1921 Truck Production by Capacities.

Size	No.	Per Cent.	Size	No.	Per Cent.
¾-Ton	33,809	21.9%	3½-Ton	3,343	2.2%
1-Ton	79,844	51.6%	5-Ton	9,714	6.3%
1½-Ton	7,076	4.6%	Over 5-Ton	3,600	2.3%
2-Ton	13,206	8.5%			
2½-Ton	3,958	2.6%	Total.....	154,550	100%

1921 Tire Production.

Tire casings produced.....	27,275,000
Inner tubes produced	33,878,000*
Solid tires produced	529,705*
Crude rubber consumed in 1921 tire production, pounds.....	379,000,000†

*Estimated from figures compiled by the Rubber Association of America considering their figures as representing 80 per cent. of the total.

†From questionnaires sent out by Rubber Association, the results of which represented about 90 per cent. of the total crude rubber consumed in the production of tires.

for short haul and, thus, increases the unprofitable short haul tonnage to be handled by the railways.

The improper use of highways by overloading motor vehicles should be denounced and effective legislation enacted to curb this practice; but the statement made by Daniel Webster at the Rochester, N. Y. Agricultural Fair on September 24, 1843, is just as true today as then—"That one great duty of the Government is to see that the products of our rich soil and industrious labor may be easily, speedily and economically transported to the place of consumption and sale." Certainly the motorizing of our Highways is a big step in furthering that end and Government might properly subsidize the increased use of the motor vehicle rather than penalize its use.

The use of the motor truck by the Electric Railway Service Departments has naturally been proven economical as a factor in trolley operation much quicker than the use of the motor bus by the passenger Departments.

In this service for public utility corporations, there are as many different kinds of uses for the motor truck as there are different types of work to be done. They are so varied it would be impossible to name them all.

A few statements of their service to the electric railway industry will suffice to suggest the possibilities:

1. In importance, is undoubtedly speed in repair work. The public will forgive most anything except delays. When a break in a regular service occurs almost anywhere in the country, the first call is for a Motor Truck Repair Outfit. Day and night they are kept on guard.

2. Emergency Tower Trucks speed at 25 to 50 miles per hour to repair line breaks. At one of the Georgian Railway and Power Company's sub-station, for instance, a motor truck was used to move a 20 ton converter into position in the sub station.

3. Where cable is to be strung on lines or go into conduit, the truck, equipped with power winch, is indispensable, both for use in loading and unloading the reel at the warehouses and for paying out the cable or drawing it through conduit in the field.

4. Poles are carried into the field. Frequently the power of the truck or the

winch is used in setting them up greatly conserving the number of men required for this work as compared with the old method. Cross arms, insulators, transformers, tools and men all accompany the construction—often enabling one crew and one truck to perform work formerly requiring a number of teams and two or more crews.

5. Where excavation is required, they are always on the job with tools, materials and men—dependable in all weather, durable through merciless punishment and most economical as well.

6. Where series of wires are to be strung on pole lines, some companies have rigged the trucks with special racks, feeding from eight to ten wires at a time, carrying all cross arms and insulators required at the same time. Many times trucks have been used by Power Companies to move buildings on their property.

7. Electric railway companies in a number of cases have had cranes mounted on motor trucks to assist in construction and repair work, and to give speedy aid in removing obstructions if a line is blocked.

8. Motor Trucks are used for patrol work, to haul feed, to transport men and material on every kind of work, and anyone familiar with the field needs of Electric trolley can specify dozens of other uses.

In addition to the tremendous value which the Motor Truck represents in the service departments of the electric railway field, there is a use of trucks for supplementary freight service which may soon grow into large proportions.

That is for the extension of electric railway freight lines into off line territory as has been inaugurated by the Cincinnati, Aurora and Lawrenceburg Electric Railway Company.

Finding themselves blocked for freight delivery and receipt at a point located five or six miles from the business center of Cincinnati, they have adopted the use of the demountable body or uniform container in use by the steam railroads of Cincinnati. They have established a service which enables them to meet steam railway competition and to give store door delivery.

Arrangements were made with the Cincinnati Motor Terminals Company to

supply them with their specially designed container truck bodies and to supplement service from their outside terminal to the heart of the business center by using these truck bodies on flat cars, instead of using box cars for freight.

By this system, the truck bodies are immediately removed from the flat cars of the electric railway company just as soon as they arrive at their terminals. The Motor Terminals Company immediately take them on their trucks, of which, a large fleet is maintained in Cincinnati for steam railroad service. This enables the Electric Railway to make delivery to their off track downtown terminal within a few minutes after the arrival of the flat cars at the outside electric terminal. Or, when the consignee is in quantity, it may be delivered direct to store door or warehouse of consignee in record time and without rehandling.

By this same method, the container bodies are filled for outbound service at the off track terminal in the heart of the city and transferred by motor truck to the electric terminal. Delivery to local way stations is then made direct from the container bodies carried on their flat cars.

This system not only saves much loss from damage, theft and misplacement, but it relieves the trolley company from much extra checking, rehandling, etc., and enables the trolley line to provide a service excelling that of any other transport. This system also is less expensive than direct motor truck haul in this case.

A somewhat similar operation, using trailers, is in service in Chicago, as part of the freight system of the Milwaukee Electric Railway Company.

As the question of contribution made to the public purse is a very important feature in any consideration of the subject of motorizing our highways, it is interesting to check up some of the dollars and cents facts. They are all very startling facts.

For instance, what man in the electric railway field not definitely interested in the motor industry is aware that the Internal Revenue Department of the United States received from the motor industry in the year 1921 the amazing sum of \$115,546,299.31 as excise tax alone, and, in addition, the sum of \$1,776,493.88 as excise tax on passenger vehicles for hire.

These millions are all in addition to the normal income tax and excess profits taxes paid by the manufacturers out of their profits as manufacturers.

In comparison, this excise tax alone, represents a sum almost one-half as much as the government received in returns from the tax on the transportation of all freight, all express and all passengers by all the steam railroad and electric railway lines in the country.

This motor industry contribution represents almost five times the government collections in taxes on telephone, telegraph and radio messages.

Corporation returns distributed by industries are not yet available for the past year, 1921; but if the motor vehicle manufacturers returns merely equaled those of 1919 (and with almost 2,000,000 more vehicles registered last year than in 1919, it is reasonable to presume they exceeded 1919), then the motor industry

contributed in income tax and excess profits tax, including motor vehicles and automobile bodies, but not including the returns from the tire and accessories industries, a total of \$79,675,544.

This 1919 tax paid was four times the total tax paid by all of the manufacturers of electric machinery, stationary and marine engines, refrigerating machinery, etc., combined.

These are governmental facts shown under table nine of internal revenue department statistics issued in 1922 covering returns of 1919, and under table three, page 89 of the annual report of the commissioner of internal revenue for 1921.

But that is not all which should be brought to your attention as this motor truck and motor bus industry relate to the financial side of our government revenues.

From the Department of Agriculture, Bureau of Public Roads, I have a tabulated sheet brought up to date and covering the year 1921, which shows that the various state governments either as state revenues or as highway department revenues, received the grand total of \$122,478,654.34 as gross motor vehicle and license revenues for the year 1921.

This tremendous sum, if applied solely to maintenance of highways (not new construction) would pay for all the maintenance necessary to keep our highways in perfect condition after they were initially paved with proper pavement to serve reasonable traffic, as it is estimated that 10 per cent. per year of original cost will maintain any properly designed and properly constructed pavement for any class of traffic. This vast sum of over \$122,000,000 would thus maintain an expenditure of over \$1,225,000,000 for new pavement. No such sum has been expended for pavement. Even if all the expenditures of all our states were combined with the contributions of the United States government for highway work.

Taken as a total sum contributed as income tax, excise tax, or as license revenue; the automobile, motor truck and motor bus provided a grand total of over \$317,700,447 of revenue to the state and national governments in 1921.

It is a fact that this was indirectly contributed by every user and owner as well as by the manufacturer, but the great total is an emphatic argument to direct universal attention to the extraordinary progress this country has made in a decade in local transportation. For, with few exceptions, all motor vehicle use, whether pleasure cars, motor truck or motor bus, is local.

The total registration of motor vehicles for 1921, as shown by the tabulations of the Bureau of Public Roads, was 10,465,995. Of these, 9,342,844 were passenger cars; 982,604 were trucks and commercial cars; 50,547 were taxis and busses.

These figures are startling. They are very important in interesting the electric railway industry when compared with the statement from the Jan. 7th issue of the Electric Railway Journal to the effect that there were 149.79 less miles of electric rail in service in 1921 than in 1920, and that the total of cars and locomotives

in service was only 106,385 in 1921 as compared with 106,688 in 1920.

These figures are still more interesting when surveys in the light of the increase in our population and in the general tendency to greater movement which came as the result of travel and change for so much of our population during the war.

These figures should be beneficial to the electric railway operators. Information often stimulates activity. Activity, rightly directed usually increases profits, improves service and broadens operations.

In the present situation as it relates to the use of the motor truck for carrying freight in cooperation with the electric or steam railway and as it relates to the use of the motor bus or the rail bus for carrying passengers in cooperation with either; this new means of local transport offers an opportunity. It is an opportunity for the railway interests to be carried along into this new field of transportation.

Sound, careful, intelligent investigation will easily disclose to the interested railway operator that these almost 11,000,000 vehicles cannot now be superceded by systems of either steam or electric transportation.

More careful analysis will also undoubtedly show that in a majority of cases not only the passenger cars, but the motor trucks and motor busses as well have been used to take care of business and personal demands for a class of transportation which either could not be cared for by the steam or electric units or for a class of transportation which it would be actually unprofitable for the older system to handle at the rate which is profitable to the motor vehicle.

The motor truck for short haul freight service offers the opportunity to pick up freight and make delivery with just two manual handlings of the goods as compared with four handlings if the goods must be loaded into and taken from a box car.

In passenger transportation the motor bus offers a system supinely flexible which may be coordinated profitably with a system rigidly inflexible.

Ultimate "economy" is a Juggernaut. That which will give to the greatest number the most good for the least money is the system of transportation which the transportation fraternity must provide.

You are the transportation fraternity. The problem, if there is one disclosed, is entirely one of profit. Each unit used by the fraternity must produce a profit. Without profit to inspire there is no interest. Without interest, there will be no energy expended to provide service, for energy is born of interest.

Already many of the electric railway fraternity have been inspired by the profit in motor truck and motor bus operation. They have expended the energy necessary to investigate. The more carefully more investigated the more rapidly will this new transport unit—the motor vehicle—be inducted into service as an integral part of electric railway operation. Thus will the "rubber urge" prove to be an economic force in transportation.

(Continued from Page 373.)
makes a report to the manager, who personally supervises the buying of all supplies.

The new company has recently procured a large fireproof service station which is used to service the buses. It is well removed from both the residential and business sections of the town and is admirably suited to the purpose for which it is used.

In the event of a bus going wrong mechanically the driver telephones to the office, the service station is then notified and another bus is ready to relieve the injured one on its arrival at the supply station. In case the disarrangement is of a nature which prevents the operation of the bus another bus is dispatched immediately to take off the passengers on that bus and complete the trip, the service men taking charge of the other.

All Service Work Done by Company.

Servicing the buses is taken care of by two experienced and well trained mechanics who are thoroughly experienced in the electrical as well as the mechanical construction of the machines. When the company first started operating, servicing the buses was done in outside shops, but this was found to be a very expensive procedure, so now practically all servicing is done in the company's own service station, except in the rare case of a job being encountered that is beyond the capacity of their shop equipment, when the work is given to a firm experienced in the particular line of work required.

The buses are equipped with pneumatic tires both front and rear, and small vulcanizing repairs are made by the service men, but if a severe fracture is incurred the casing is removed from service and sent to a competent tire man, who instructs the company as to the advisability of repairing the shoe. If in his opinion the tire can be efficiently repaired in a way that will remove the expectation of constant trouble from it, this procedure is sanctioned by the company. If the quality of the repair will be at all

doubtful the entire shoe is discarded.

The ordering of new parts for the buses is done by the head service man, who ascertain the exact description and number of parts wanted, places the order and makes the proper entry in the company's books on receipt of the part, the books showing at all times just when a part was received and when it was replaced.

Overtime is not necessary in servicing the buses as the runs are arranged in such a manner that a careful watch can be kept on the bus performance and adjustments and minor repairs are made before they have advanced to the dangerous stage. As a matter of fact there has been very little repair work done on the buses to date, all of them having given extra good service. This attitude of the service men, being always on the alert to catch the first warning of disarrangement, saves them a great amount of work and the company benefits by fewer and smaller expenses. If any of the buses develop symptoms which are at all puzzling to the driver, at the first trip past the service station he stops and has a service man ascertain the exact reason for the faulty action, and if the cause is not easily removed the bus is withdrawn from duty.

Keep Accurate Performance Record.

The record of the bus on each of its passages is kept on a trip sheet very similar to the ones used by electric railways. On this sheet the driver records a correct account of the business transacted during the day. At the end of each day's running these trip sheets are turned into the office where each of the various entries are carefully checked. Some of the information given on this form sheet is the driver's name, the number of the bus, the number of trips and the terminal point. All buses leave from the center of the community and their time is checked at the main office.

The terminal points shown on the trip sheet designates the town to which the bus travels from the main office. The number of fares collect-

ed and the exact time of arrival and departure from the terminal point is shown as well. Another portion of this report has space for the entry of the bus performance on each of the various trips and the mileage covered. This allows a ready check by the company on the mileage obtained from all tires.

Buses Average 8.5 Miles to Gallon.

This makes the milage obtained to each gallon of fuel about 8.5 miles. This is an exceedingly low figure when the number of stops and the size of the vehicles being propelled is taken into account and it undoubtedly may be attributed to skillful driving and the friendly rivalry between the drivers in their endeavor to make a greater mileage on the same amount of gasoline than was ever recorded before by the company.

Special Color Scheme Aids Patrons.

The buses of the company are all painted white with blue striping, which makes them easily distinguished from all other vehicles on the highway.

The advantages to many of the line's patrons of this color combination was explained by a matronly looking housewife of the community with whom the writer talked. "Usually I travel to Mansfield twice a week," she said. "I like to go in the morning and plan to get my work completed in order to catch the 10 o'clock bus. The window in the kitchen of my home is so located that it faces toward Foxborough. While I am working in this room I can see the bus coming over the top of the hill about one-half mile from my house, recognizing it by its unusual color scheme. I gather my wraps and shopping basket and before it arrives have plenty of time to be out in front of the house and get it." She stated that many of her neighbors considered the color plan splendid for the same reason.

Does Own Painting.

The painting of the buses is done by the company in its own service station. This saves considerably on both time and money. Two of the buses already have been repainted and the workmanship displayed on

them increases the attractiveness of the vehicle. The painting is done upon the recommendation of the head service man, who places the order to have a certain bus painted. The number of coats applied depends directly on the condition of the original paint. Very often it is necessary to apply five or six coats in order to obtain a first class job.

In order to enlighten the reader as to the kind of men who are now actively interested in the operation of the bus line a few words regarding the principle stockholder and manager, his experience, plans and methods should prove interesting.

For nearly 35 years F. M. Perry has been actively engaged in the solving of public transportation problems, having started as a young man in 1888 with the Quincy Street Railway. It is interesting to know that Mr. Perry operated the first electric car that ran from the city of Quincy to Braintree at a time when electric cars were looked on as skeptically by some people as the gasoline driven vehicle was a few short years ago. He also operated one of the first electric cars between Quincy and Weymouth. In later years Mr. Perry was offered better inducements with the Quincy and Boston Street Railway Company, and accepted in order that the ability he felt he possessed could be used to better advantage. In 1898 he was placed in charge of the Boston, Milton and Brockton Street Railway Company and for a number of years brought his experience to bear in solving the problems of this company. In 1902 he was selected as superintendent of the Norfolk and Bristol Street Railway Company, where he remained until that company discontinued operations.

Mr. Perry conducts the bus business along lines closely paralleled to those governing the operation of the electric railroad. He knows traffic conditions thoroughly and has records which cover this section of New England for the past 10 or 12 years which prove of decided value in his work.

The service station fairly com-

plete at present eventually will be equipped with appliances to accomplish the largest job. This will entail the installation of lathes, planers and millers and more elaborate vulcanizing equipment.

Will Keep Entire Engine in Reserve.

Another splendid idea which will be placed in effect by the company is the keeping of an entire engine in reserve at all times so that when a bus develops severe engine trouble all the work that will be necessary under these conditions will be the removal of the troublesome engine and the substitution of the spare. The service station then will be able to overhaul the injured power plant at its leisure, the company will not be deprived of the services of the bus and overtime will be reduced to a minimum.

A large and well provided stock room is another feature which will be made one of the company's assets, where an assortment of parts for all buses will be carried. This will enable the buying of supplies in such quantities to materially reduce the purchase price and the profits of

CASH SALES INCREASE.

IN NEW YORK and vicinity manufacturers have noted the recent increase in cash sales and the marked decrease of credit sales. The reason for this isn't given, but it is a fact that by overloading a five-ton truck it will carry 350 cases of whiskey and the regular price for moving this article is \$10 a case from Jersey towns to New York, cash in advance. Perhaps this accounts for the reason why manufacturers and dealers are not being pressed too hard for credit as one trip made by the trucker would about pay for the price of the truck.

The owner of the whiskey or his representative is said to accompany the trucker on his trips, by the way, carrying in his pockets several thousand dollars in case any trouble should occur.

the stockholders will be augmented by this procedure.

Good Field for Buses in New England.

The concensus of all opinion seems to be in favor of the motor bus in this section of New England. The many users of the buses appear to be well pleased with their performance and praise them in a manner that speaks well for their future. One resident of Foxborough who uses the bus line daily to go to Mansfield, where he takes train for Boston, made the assertion that he had not missed his connection once in several months of traveling by the bus line. Still another who is considered an authority on road construction in Massachusetts was asked if he did not consider the buses a menace to good roads. He asserted that more damage resulted to the roads from speed maniacs in one year than could result in five years from the moderately driven pneumatic tired bus.

That the people of this section of New England desire to have good transportation by means of the motor bus is attested by the liberal appropriation made at a recent meeting of the citizens for the building of a new highway from Foxborough to the South Walpole line to accommodate the buses.

When Mr. Perry was asked to compare the utility of the bus with the electric car, he stated that there was no need of a comparison along this line, as electric cars give entirely satisfactory service in localities where the traffic warrants their usage. On the other hand, in many places buses can be made to solve the transportation problem where electric cars have failed. This is the condition which exists in the community in which he lives and he feels that he can capably solve the transportation problem for the people of Foxborough, Mansfield, Wrentham and South Walpole in a way which cannot fail to merit approval from all the inhabitants of these towns. Already he has done much toward proving his contention and the service of the company is admitted to be improving daily.

(Continued from Page 372.)

The Development of Many Years

In obtaining the correct design various forms of construction were subjected to the most exacting tests and found unsatisfactory. This process of elimination was continued until a design to the inventor's liking was obtained which had no junctions or joints and that proved by actual tests to be right from every viewpoint.

In the latest development of the perfected Dayton Cast Steel Wheel the spokes are arched and are of hollow cross section, as this type of construction, by proven test, will withstand very great end and side strains. The hollow spokes and rim have no appreciable line of demarcation, but on the contrary flow into each other in wide sweeping curves, which insure uniform and continuous strength. There is no cleavage or break in the texture of the steel.

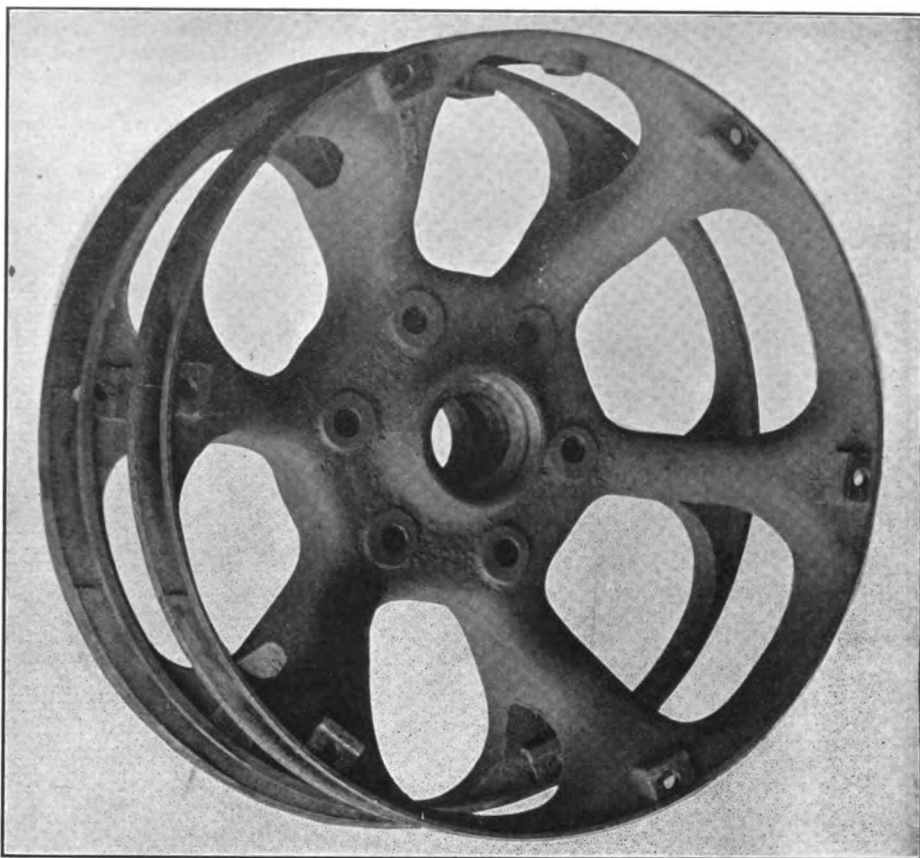
The Dual Pneumatic Cast Steel Wheel.

Recently an addition was made to the already extensive line of the company. This new product, known as the Dual Pneumatic Cast Steel Wheel, has many interesting and novel features which are of decided interest to the automotive industry. The wheel is produced from the same special cast steel of which the other Dayton wheels are made. It has withstood the most rigid tests and has been found to possess exceptional strength and elasticity. It has been designed in such a manner that the finished casting contains no sharp or abrupt joints which might be the cause of inferior castings when the metal is being poured. The spokes, hub and rims are cast integral as in the other Dayton wheels, but here the similarity ceases for this wheel, while having only one hub, has two rims, with a center distance of 8 1/16 inches between them, each one of which is finished to receive standard rims and rim equipment.

The dual pneumatic wheel is designed for either a 34 by five or a 36 by six rim and when equipped, with the tires in place, a sufficient space is maintained between them to

allow the tightening of a loose rim clamp, without the necessity of removing the outer rim. In designing the wheel care was taken to eliminate all abrupt joints and crevices, which prevents the accumulation of dirt and checks corrosion. Economy is also a prominent feature of this new wheel, for it allows the bus or truck owner to purchase a standard and regular stock tire at a much greater saving than could be possible in buying a large special size.

for all the Dayton Cast Steel Wheels and which applies to the new product, as well, is the heat conductivity of the material used in their construction. Steel is a conductor of heat while wood is not. When a power vehicle is being operated over the very best roadbed, friction causes the generation of a great amount of heat in the tires. This heat is injurious to the tire construction and it is a decided advantage if it can be removed. The use of the special cast steel used in



Great Strength and Durability Is Expressed in Every Line of This Recent Addition to the Dayton Steel Foundry Company's Products.

By using this type of wheel, it is stated that all tires on the machine are made interchangeable, thus making it possible to replace a rear tire by one which previously had been used on the front wheels and dispensing with the necessity of carrying two different sizes of spares. At the same time the traction effort of the vehicle is not decreased by these smaller tires, as each of them does its apportionate amount of work and in this way the same results are obtained as by the use of larger tires.

Metal Used Lengthens Tire Life.

Another decided advantage claimed

the Dayton wheel lengthens the life of the tires it is said by conducting the heat away from them to the steel rims and spokes of the wheel, which afford a radiating surface upon which the atmosphere can act.

In placing the rims on this wheel the first tire and its rim are slid over the outer rim and onto the inner rim of the wheel, being brought to a firm position against the bevel ring seat cast integral with the wheel. The ring against which the rim holding clamps act is then placed in position and the clamps securely fastened. This entire operation is performed

as if the wheel had but a single rim. The bevel wedge ring against which the outer tire and rim are seated is next placed in position and the second tire securely fastened in the same manner as the first one. Each rim of this new type wheel is equipped entirely independent of the other and may be treated as if it were a separate wheel.

The operation of tire changing is lightened considerably by the use of the smaller tires and the need to handle but one small rim at a time.

readily accomplished as the space between the spokes and between each rim is adequate to allow the performance of any necessary work.

The brake drum is manufactured separate from the wheel, but is accurately machined to fit a shoulder turned on the wheel. It is then securely held in place by six bolts passing completely through the drum and wheel proper. The nuts for tightening the drum to the wheel and all other nuts are on the outside of the wheel and easily ac-

Electric instruments keep the operatives of the furnace informed at all times of the exact temperature and the course of events within the furnace. Electrical devices are instantly readjusted should a change of temperature be necessary or desirable.

Annealing Process Enhances Performance.

After casting the wheels are subjected to an annealing process. This consists of placing the castings in a furnace where a uniform temperature of the proper degree is maintained for a predetermined period. Placed within this furnace is an instrument known as the thermocouple, which is connected to recording dials in the chemical laboratory. After this treatment has been continued for the proper length of time the wheels are allowed to cool off gradually. This annealing process removes any stress or strain from the casting which may have been caused while the metal was cooling in the mold, and causes the crystalline structure to adhere more closely together.

The castings are next taken to a splendidly equipped and modern machine shop, where they are machined to accurate dimensions. The hubs and rims are first rough bored and turned, after which the finishing cuts are carefully taken to insure the hub and rim being exactly concentric. The partly machined wheels are then taken to the drill presses where jigs are employed to make all holes drilled in proper relation to each other. The jigs used in this drilling process are manufactured to extreme exactness, thus insuring each wheel drilled to be a counterpart of any other wheel previously finished. In this operation brake drum through bolt holes, hub holes and rim bolt holes are all machined in their proper positions.

Wheels Undergo Severe Test.

The manner in which government tests of these cast steel wheels have been conducted, as well as the results obtained, should prove interesting and instructive to any person interested in the advancement of power vehicles. The wheels



Standard Rims of Any Make Are Fitted to This Dual-Pneumatic Steel Wheel as no Special Appliances Are Used for Rim Fastening.

The smaller diameter of these rims also affords a lower center of gravity for the truck or bus. Another feature upon which the manufacturer places great stress is the factor of safety afforded by a dual wheel, in case one tire would blow the tendency would be for the bus to drop suddenly and perhaps turn turtle, but in such an emergency the second tire is capable of withstanding the extra duty imposed upon it until the fractured tire has been repaired or replaced. When it becomes necessary to inflate the tires it is

cessible. This aids in preventing accidents caused by loose or broken bolts.

Wheels Made in Modern Plant.

Modern appliances only are used in the manufacture of these wheels. The up-to-date foundry is equipped with electric furnaces in which the grade and quality of steel used is easily tested before being poured. By using this type of furnace hazardous methods of the old-fashioned process are replaced by methods which insure uniform and exact castings from each charge of metal.

when tested were without either tires or brake bands. All bearings were removed and brass bushings substituted. Four small holes were drilled and tapped in the rim of the wheel at 90 degree intervals. Holders for dial indicators were then attached to the wheel and fastened by passing cap screws through the holders and into the tapped holes. These indicators were so adjusted that a contact was made between the indicator pointer and the short axle inserted inside the hub of the wheel.

The wheel was then placed in a 2,300,000 pound capacity hydraulic testing machine. Bearing blocks were applied to the axle on both sides of the wheel and the pressure exerted diametrically opposite. This test was to ascertain the exact performance of the cast steel wheel under tremendous pressure. The pressure was applied through a block at the rim which distributed the load through an arc of six inches and over the entire width of the rim at a section between the spokes. The changes taking place within the wheel were readily ascertained by the indicator readings.

The wheel was next subjected to a severe side thrust or skid test on the same type of axle as that used for determining the radial changes. The axle was held as nearly rigid as possible and the pressure exerted to a section of the side of the wheel rim through a block six inches wide. The load was applied between the spokes and approximately 90 degrees from the section under load in the radial test. Two dial indicators were used in this test, one so placed that it recorded the changes in the rim at the point where the load was being applied, the other was placed diametrically opposite. In this trial the wheels were loaded until they broke.

In these tests the Dayton Cast Steel Wheel was subjected to a pressure 100,000 pounds in the radial test and showed a permanent set of approximately one hundredth part of one inch. This same wheel when subjected to the side thrust test required the effort of 101,000 pounds

to break it.

The manner in which the Dayton wheel withstood these tests proves conclusively the reserve strength of the wheel. It also indicates that the reason for this exceptional strength, resiliency, lightness and durability must be the correctness of material, design and construction.

GOVERNMENT TRUCKS USE TOO MUCH GAS.

WASHINGTON, D. C., July 10.—According to the United States Bureau of Mines, the consumption of gasoline by its motor trucks depends upon three equally important factors, namely, the machine, the carburetor adjustment and the driver. The bureau has discovered by experimentation that it is possible to make a saving of approximately 25 per cent. by having the carburetor properly adjusted at all times.

Exhaustive tests were conducted on the 40 government operated trucks used in hauling coal for the fuel yards at Washington, D. C. Practically all the trucks were found to be using too rich a mixture and the final adjustment was made to have the exhaust of all trucks show in analysis between 11 or 12 per cent. carbon dioxide.

BOON TO ROADBUILDER.

(Continued from Page 384.)

end of the truck is headed in the opposite direction from the one it occupied only 15 seconds before. It then stops and the truck moves off the table.

It is extremely fascinating to watch the action of this machine; a person wonders if it won't at some time or other, fail to stop and instead continue its revolving motion. But it never does for the release and engagement stops are automatic and so positive in action that the most careless driver may use this table without any danger of disarrangement of its mechanical units, it is stated.

The turntable is nine feet wide and the whole swinging circle is 17 feet 10 inches, which leaves plenty of room on either side of the table for the trucks to return from the point of construction, without congestion being experienced. This allows the placing of the table as close to the point of construction as is

convenient to back the trucks to the other side of the road, which would be approximately 100 feet. As the work under construction progresses the automatic turntable is moved along with it as readily as though it were a trailer for a camping party. Considering the heavy duty to which this table is frequently subjected it is comparatively light, as it weighs but 6½ tons and is easily portable.

Much ingenuity has been exercised in the provisions made to make the moving of the table from one spot to another an easy matter. It is equipped with transfer rollers, which are attached to the truck which does the hauling, the pulling action of the truck causes the entire table to be lifted from the ground and the transfer rollers become a real substantial aid in moving the table to its new destination. When the work has been completed in the immediate locality of the device and it is desired to move it a considerable distance it is equipped with wheels which are supplied with the machine by the manufacturer. It is then attached to the rear of the truck and travels trailer fashion.

NELSON MOTOR TRUCK.

(Continued from Page 368.)

Hoover patent, consisting of a system of principle and auxiliary leaves, each leaf scientifically calculated to come into action at cumulative loading points. Total possible spring travel, eight inches, allowing 3½ inches reverse under severe road shock, without striking load on bumpers.

Special Features — Underslung rear springs, chrome vanadium, frame arched over rear axle, with risers placed out in wheel houses. Very low hung body and center of gravity, flexible springs and long spring travel without hitting on bumpers, except in very extreme conditions when overloaded. Widest possible frame so placed as to make one-half the frame width exactly equal to the height from the ground, thus insuring absolute stability and freedom from side sway.

(Continued from Page 349.)

outer edges. Then the wide frame admits of the lightest possible form of body under frame. The wide frame also is a factor from the standpoint of the passengers' comfort. This point will be referred to later.

We believe that the overall length of a motorbus for city service should

turning a corner.

Regarding the rear track we believe that the outer edge of the tires should closely correspond to the extreme over-all width of the body and that the rear springs should be as close to the tires as is practical. For buses as above described the rear track should not be less than 72

termining factor from an accident prevention standpoint.

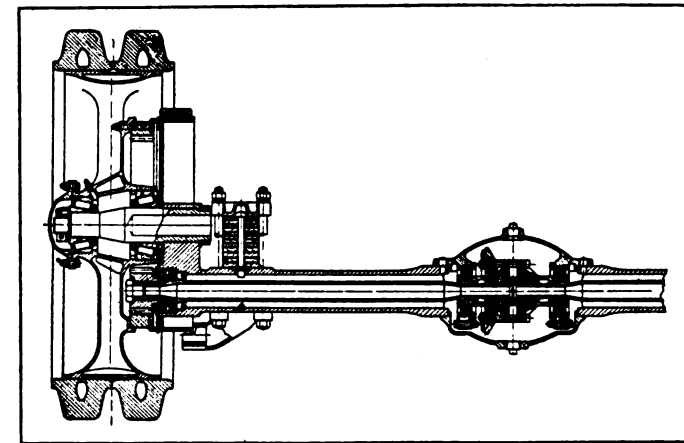
The brakes of a bus must be free from undue noises such as squeals or rattles. This means, among other matters, the use of special brake-drum material. The best plan is to employ treated steel forgings or, failing in this, steel castings with a high carbon content.

The friction surfaces must have long life, and the adjustment be such that no tools or special skill are necessary. We attach considerable importance to the matter of fool-proof adjustment.

The braking action must not be too abrupt. It must be positive yet not sudden and violent, for such a condition is exceedingly severe on the driving members, tires and body. It is also a frequent source of accidents from which serious claims may result. Brakes must be sufficiently good, yet not too good. Excessively efficient brakes have a most marked influence on tire wear. It may be said that tire wear is almost directly proportionate to the effectiveness of the brakes.

Short Turning Radius.

One of the great advantages of a bus over any other form of transportation unit is its flexibility. A



Cross Section of the Type L Axle Detailing the Mechanical Principles Involved in Its Construction.

not exceed 26 feet; the total width, 7 feet six inches and the over-all height for single-deck vehicle, nine feet. With the double-deck bus the last named dimension should be such that a person standing on the top deck can clear a 14-foot structure. With these dimensions we have found it possible to accommodate comfortably 51 seated passengers with our double-deck and from 25 to 29 with our single-deck vehicle.

Next there is the question of important dimensions other than those over-all, such as the wheelbase which naturally affects the axle load distribution, the turning radius and the general comfort and balance of the vehicle. For the class of vehicle now under discussion we believe that this dimension should not be less than 168 nor more than 180 inches.

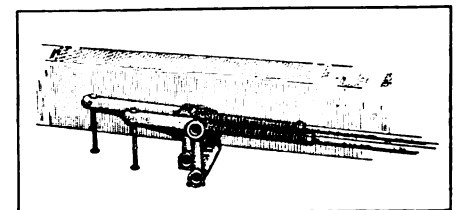
The front track should be ample in width and not less than 65 inches, for to turn a bus within the intersection of the average city street it is necessary to move the front wheels through an angle of not less than 35 degrees. This determines the distance between the front axle pivots and the springs. The spacing of the front springs should not be less than 36 inches, since they are responsible to a large extent for the stabilization of the vehicle when

turning a corner. This will bring the distance between the springs to approximately 52 inches. Having decided the approximate distance between the vehicle springs it naturally follows that the best design is to arrange the frame dimensions so that they connect with the springs in the closest and most practical manner.

Effective Brakes.

Perhaps the most difficult problem that engineers must face is the brake question. Even now it has not as yet been solved entirely satisfactory, at least insofar as our knowledge goes. With the bus the number of applications is vastly in excess of that of the average truck or automobile, and the brakes of a bus must be sufficiently powerful to lock the wheels at any moment. Yet the effort required for average application must not be such that a driver may become exhausted as a result of the work imposed upon him.

Particular attention must be paid to the location of the hand brake lever. It should be positioned so that it can be grasped firmly without moving the body out of the normal seated state. We believe the best practise is to have the lever arranged for a push and not a pull-on. Time can thus be saved, and a fraction of a second is often the de-



Outside Mechanical Brake Adjustment.

bus can be switched around at any point, and it is highly desirable that it should be able to make a complete turn in the average thoroughfare without backing, for the latter practise if followed in congested areas merely adds to both confusion and congestion. There is also a marked possibility of increased number of accidents.

A short turning radius is dependent on the interference of the tires with the drag link, front springs or frame, when the wheels are turned at the maximum angle. The controlling elements are wheel spring tracks and wheelbase. As the ra-

dus of the steering angle equals the wheelbase divided by the size of the front wheel lock, it can be seen that a wheelbase of reasonable length is important to secure a short turning radius.

From the viewpoint of safety the design features dictated by human considerations are:

(1) Easy steering, (2) clear vision for driver, (3) comfort and convenience for driver.

Easy Steering.

The steering of a bus should be at least as easy as that of the average automobile. To operate a stiff steering gear is a hardship that certainly should not be inflicted upon the driver of a public service vehicle. A driver's energy and effort must be concentrated on his regular duties, and if he becomes fatigued through the expenditure of unnecessary effort, faulty operation is bound to result. This means possible accidents. Tests have convinced us that the actual physical labor imposed on the driver of a bus in connection with the manipulation of a steering wheel represents by far the greater proportion of the sum total of his work.

Ease of steering is controlled by the total ratios between the hand and road wheels. Naturally frictional losses in the steering gear box and steering knuckles are of importance. Minimum losses in these respects are dependent upon the use of properly lubricated anti-friction bearings. Another very important matter is that the pivot pins should lie in the vertical plane; otherwise there will always be a tendency to lift the front end of the bus when turning the steering wheel. An angle in either the longitudinal or transverse plane will cause lifting at the expense of effort on the part of the driver.

It is highly desirable that there should be an absence of shocks at the steering wheel. This is largely controlled by the total ratio, but also by the distance between the point of contact of the wheel and the road and the intersection of the knuckle center line and the road. This is the only point in the steer-

JUNE SHIPPING INDICATES NEW RECORD OF 271,022 CARS AND TRUCKS.

Shipping reports to the National Automobile Chamber of Commerce, 90 per cent. complete, indicate that June shipments will reach a total of 33,000 car loads, 30,500 driveaways and 7900 boat.

On this basis it is estimated that 271,022 passenger cars and trucks were produced by all makers in June, an increase of six per cent. over May and 51 per cent. over June, 1921. Last year June production increased nine per cent. over May.

The factory shipping figures for all manufacturers are:

	Car Loads		Driveaways		Boat	
	1922	1921	1922	1921	1922	1921
January	15,357	6,485	7,479	3,185	143	93
February	19,636	9,986	10,173	7,507	180	99
March	27,753	16,287	16,917	9,939	560	75
April	31,334	20,187	22,381	14,197	2,960	1,619
May	34,324	18,608	28,760	15,193	7,366	2,381
June	*33,000	20,269	*30,500	18,834	*7,900	3,947

*June, 1922, partly estimated.

ing linkage where a change increasing the total reduction does not result in increased steering wheel travel for a given lock. A short drag link or the incorrect alignment of the drag link with the front springs will also result in shocks at the steering wheel when passing over rough roads.

Minimum steering wheel travel is important as it makes a change of hand position unnecessary for ordinary driving. It also decreases the apparent back lash, which is present in all steering mechanisms. The steering wheel travel is roughly inversely proportional to the total ratio, which is kept as low as possible for this reason.

Clear Vision for Driver.

This very important feature can be accomplished only as a result of joint chassis and body design. The driver should be located close to the left hand side. This permits him to observe and also to signal his intentions to oncoming traffic. There should be absolutely nothing obstructing his view. He should face clear glass. It should also be mentioned that with single-deck vehicles the placing of the driver well over on the left hand side provides for the very necessary boarding and alighting space for passengers and ade-

quate room for operation of door.

Briefly, a driver's vision should be such that when seated, even back of a closed windshield, he will have nothing on which he can readily concentrate, no vertical posts or obstructions of any kind. He should just naturally sense that he is in the open.

Comfort and Convenience for Driver.

This is largely a question of seat formation in conjunction with the correct positions for brake, change speed levers, pedals, accelerator, etc. Obviously, it is not a practical matter to give the driver of a bus as much room as with a touring car; therefore, much care and thought must be paid to the placement of pedals and levers. The conventional cowl as used in automobile practice is almost out of the question, for anything that tends to increase the over-all length of the vehicle is distinctly undesirable, particularly if such increases add nothing to the passengers' seat or pay load space.

The driver should be comfortably seated at all times. He should be able to reach his change speed or brake levers without body movement. He should have ample leg room and not be obliged to cramp his limbs when his feet are either on or off the pedals. The value of the

flat floor from the standpoints of both passengers and driver is apparent; also the side control without which there is of necessity a considerable loss of most valuable space.

Comfort and Convenience of the Public.

The American public is automatically inclined and the percentage of those owning cars is so large that when riding in any self-propelled vehicle there is a natural tendency to compare its behavior with that of an automobile. In designing a bus this factor must under no circumstances be lost sight of. The success of any public utility depends on the good will of the public. It has been correctly stated that the permanence of any business depends upon the good will of those it serves and that no business can achieve permanent success that does not give in exchange for its earnings at least an even measure of helpful service. This applies especially to public utilities, and the truth has been abundantly proved in connection with the operation of our enterprise.

From the viewpoint of design it is essential that consideration be paid to the attitude of the public as a whole. It is not enough to consider only the attitude of the actual riders; regarding the matter of comfort from these somewhat different angles, it is necessary that attention be given to

(1) Riding ability, (2) reliability, (3) silence of operation, (4) smoothness of starting and stopping.

Riding Ability.

Broadly, this is a matter of proper spring design. There are, however, other important influences; the wide frame, track and spring centers bear materially upon this question, for the nearer the wheels are to the outer edge of the body the less will be the movement to which passengers must be subject when obstacles are passed over. Again, with the wider track, many of the ruts and depressions created by vehicles of narrower gage, will be passed by. Incidentally, this is quite an important matter from the standpoint of road wear. The wide track also

A GOOD IDEA, THIS.

EVERY auto bus must come to a full stop at all grade crossings in the State of New Jersey to ascertain if it may cross the tracks safely, an order just issued by the Public Utility Commission directs. Failure to halt will be considered cause for withdrawal of the board's approval of any municipal permit to operate an auto bus. It is probable that this new law will meet with the approval of bus drivers, many of whom have been practising it ever since they entered the business.

diminishes the wheel pocket projection inside of body. The modern tendency is to employ cross seats and with the narrow-gage vehicle the wheel pockets are a source of much discomfort to those seated upon the inside immediately over them. A rigid frame, correct axle load distribution and minimum overhang are all factors that make for a better riding performance.

Apart from the points briefly touched upon above, the controlling factor from the standpoint of riding ability is, of course, the design of the suspension itself. Obviously the difficulty is to obtain good riding under all conditions of load. Spring design is always a compromise; a spring must be able to withstand maximum load, yet vehicles are expected to ride reasonably well when light. As a matter of fact they seldom, if ever, do so. In general more damage is done to vehicles when running light than heavy because the riding properties under these circumstances are at their worst and the speed too often is high. Under conditions of heavy load springs function best, and at the same time there is less likelihood of excess speed.

We believe that the answer will be found largely in the employment of what we term the progressive spring. This spring is split into two parts. The top half takes the weight

of vehicle, body and a certain proportion of load. The bottom part or helper comes into action progressively. The top part must make a rolling contact with the bottom. One of the great advantages of this system is the fact that for no additional cost or weight, a marked improvement in performance is possible. No doubt it will be appreciated that to secure comfortable riding with a small number of passengers it is necessary to have a spring of not over 670 pounds per inch deflection. But a spring having these characteristics is not a practical arrangement, for the result would be too great a difference in body and step height between the minimum and maximum number of passengers.

Silence of Operation.

It is a problem to produce a silent vehicle. It is doubly a problem to retain this state throughout the life of the vehicle. Silence necessitates freedom from engine vibration, quiet transmission gears, evenly stepped gears, a quiet rear end, and generally the elimination of all rattles and squeaks from both body and chassis. To attain this every detail of design must receive the most minute care. Silent operation is necessary in crowded thoroughfares, and certainly the people demand this condition in the residential areas, particularly at night when the streets are comparatively empty and noises become automatically emphasized. As a rule, noises are tolerated simply because such things are nearly always with us, but in the quiet of the evening sounds that ordinarily pass unnoticed become startlingly evident.

Reliability.

The word reliability with a bus attains an entirely new meaning. The entire design must be predicated on ability to give uninterrupted service between clearly defined periods, preferably based on mileage. The ability of a bus to fulfill this requirement with particular reference to the duration of period will at once determine the utility of the design. The public will not long tolerate an unreliable service. Failures with an automobile cause con-

fusion enough, but the number of persons involved as compared with a bus is relatively insignificant.

Smoothness of Starting and Stopping.

Smoothness of starting is primarily a clutch function, but of course the driver is a factor. Correct gear ratios, satisfactorily performing engine and proper axle load distribution are contributing influences. Quick starts and stops are highly dangerous from the viewpoint of possible accidents. Some of the heaviest claims for injuries and damages result in this manner. Apart from injuries to passengers, quick starts and stops do more toward causing damage to the chassis and the bodies than anything else. All driving members are subject to abnormal stresses with the former. With the latter the fore-and-aft or lateral movement, which of necessity results, causes a loosening up of post joints, panelling, etc., and consequently a very high rate of depreciation.

Of the various features that make for efficient and economical operation, the clutch is perhaps one of the most important.

Maximum Accessibility.

It is fundamentally necessary that the design of a motorbus be such that inspection and repairs can be carried out quickly and economically. We believe it is imperative that separate unitary construction be followed. For instance, engines, carburetors, all electrical equipment, fans, clutch couplings, transmissions, control levers, axles, wheels and propeller shafts should all be entities unto themselves, so that the repair of any one of these assemblies will not necessitate the removal of any other.

In connection with the matter of accessibility, it should be remembered that repairs and adjustments must be occasionally carried out at night, sometimes under most unfavorable conditions. Again, assuming the use of low level equipment, the design should be such that inspections, repairs and renewals can in practically all instances be undertaken from the sides or underneath

the vehicles. This means the use of pits. Experience has shown that it is highly unsatisfactory to carry out chassis repairs from the inside of the body. Mechanics are sometimes careless and this results in unnecessary damage to the interior fittings, particularly the seat cushions.

It seems scarcely necessary here to argue as to the desirability of light weight. These remarks particularly apply to the matter of unsprung weight. Assuming good design, obviously minimum weight means minimum fuel consumption, maximum acceleration and speed and minimum costs for repairs and renewals. These are the controlling elements. Henry Ford started out with this idea firmly imbedded in his mind and, as far as we know, he has had no cause to change his views.

Clearly the lighter the vehicle the easier the solution of our problems. Heavy vehicle weight means unnecessarily large tires, stronger axles

and frame, larger brakes, slower gear ratios and last but not least, more engine power. The entire theory of design should be based on the highest safe vehicle speed for the smallest throttle opening, and consequently the minimum number of engine revolutions. Of course this is out of the question if we start off with an unnecessarily heavy unit.

Maximum Safe Speed.

The greatest single factor from the standpoint of economical operation is speed. This point is perhaps not sufficiently recognized. The following facts in connection with our operation may make the matter somewhat clearer. During 1921 we spent in platform payment, drivers' and conductors' wages, in round figures, \$1,625,000. So for each one per cent. economy in speed there is a yearly potential saving of more than \$16,000. Looking at the situation another way the ratio of expenditure between our platform payment and all money expended in connection with repairs and renewals to chassis and bodies is approximately five to one.

From this it is clear that while there are always opportunities to effect a saving in connection with maintenance methods generally, the real solution is to employ the fastest possible safe speed and to drive the vehicles up to the limit of their endurance. This, of course, necessitates all that is best from the standpoint of design. Naturally, to maintain a high average rate of speed, rapid acceleration is essential. But in connection with this matter it is well to bear in mind that there is nothing gained and much lost if the engine power is in excess of actual requirements, for it is bound to be abused. A very real problem is to ascertain with each operation the exact amount of power required, then to adopt a standard carburetor setting with a view to its proper control. Obviously the question of acceleration, deceleration and maximum safe speed are closely allied. Reference has been made to deceleration under the heading effective brakes.

LIVE TRUCK MAN WINS.

IT TAKES close figuring these days to get and hold business," said Frank P. Hunt, distributor of GMC trucks at Rochester, N. Y., the other day. "A man doing hauling contracting has to be well equipped and very much awake to keep out in front. Among our customers is one man who is thinking all the time. He went into a gravel hauling competition not long ago, where there were several entries. He got the job, too, by being better fixed than the other fellows. Part of the road they were hauling the gravel over was a pretty stiff grade and where our man won out was that his loaded truck was going over the hill on its own power. The other fellow was delayed every time because he was waiting for help from one of his other trucks. Our man had the equipment and he got the job. It was the time saved on the grade that did it."

In the earlier days of bus operation the tire question was one of our chief anxieties. Today the situation is very different for wonderful improvements have been made in tire manufacturing methods. Of course there is no sense in decreasing tire expenditures at the cost of the equipment generally. Resilient tires are essential and too great a wear must not be permitted. It is our regular practise to remove a tire immediately the rubber has worn to within seven-eighths inch of the hard base.

In looking back over our records it is extremely interesting to note that in 1911 our cost per mile for tires was 4.93 cents. From that date on a steady reduction has been effected. The figure for 1921 was 0.87 cents per mile, and this, of course, includes the use of six tires. From our viewpoint the factors which have permitted this condition to be reached are, in the order of their importance:

- (1) Better tire manufacturing methods.
- (2) Improved vehicle design. This includes decreased weight, particularly unsprung weight, the substitution of metal for wood wheels, etc.
- (3) Closer supervision from an operating standpoint.
- (4) Closer supervision from a maintenance standpoint.

ERRATUM.

The June issue of Motor Truck contained a list showing where parts for "orphan" cars and trucks might be purchased. Through an oversight the name "Republic" was used without specifying that it referred to a passenger car formerly built and not to the Republic Truck Company of Alma, Mich., the latter as is commonly known being one of the largest builders of motor trucks in the United States at the present time.

This explanation is made to offset any wrong impression that may have been gained by our readers.

EWING NEW SALES HEAD.

YORK, PA., July 9.—Martin-Parry's entire marketing plans have been voted in care of Joseph Ewing, just appointed in capacity of director of sales with George Hotte as assistant director of sales.

During Mr. Ewing's former connection with Martin-Parry in the capacity of assistant to the president very unique angles of merchandising were introduced.



"GETTING up in the world a bit, aren't you?" I asked O. M. Vett as I strolled into his office shortly before 5 o'clock one afternoon.

"What'd'ye mean?" grunted Vett, looking up from the trade journal he was busily reading. "Ain't I always been up enough to keep even with your kind?" he asked.

"I saw you demonstrating a truck to Himmony the contractor the other day—that's what I meant by getting up in the world," I explained. "You've got a fine chance of selling him any of your line," I added just to see how the old fellow would take it.

"Is that so," he stormed, tossing aside the trade paper. "So I've got a 'fine chance' have I? What's the matter with my line I'd like to have you tell me," he asked.

"Not a thing the matter with it—best line for the price on the market—what I meant was that Himmony always buys the ——— truck; a machine that costs just about twice as much as yours does, that's all," I said.

"He always did buy the ——— truck," corrected Vett, "but he don't any more. He bought three offa me the other day and he'll buy more—what dy'e think o' that?" he asked triumphantly.

To tell the truth I was surprised. "What's the matter with the ——— truck that he's had so many of," I asked. "Thought he always swore by them."

Vett nodded. "They're ain't anything the matter with ——— truck—nothing at all. He still likes 'em first rate; better than he does mine to tell the truth."

"Then how does it happen you're selling him yours," I puzzled.

The old salesman laughed "It isn't the truck I'm selling that appeals to him so much as it is the service," he said. "The ——— truck is a winner; it handles the load good, is fairly economical on upkeep and in every way is a truck to be proud of—but when one of 'em breaks down—when it even so much as loses a spring shackle—then you got to lay 'em up for a couple of weeks."

I nodded. "I understand they don't have much of a service station," I said.

"When one of our trucks breaks down," continued Vett—"regardless of what the trouble may be—we'll have it on the road again just as soon as we can make repairs. We won't hold a man up for stock—we won't charge him double time for overtime—we'll simply put our day and night men onto the job an' they'll stick to it until it's ready to go to work again; that's the reason I had no great trouble in selling Himmony my proposition. I sold him service—not trucks."

MAKES EASTERN TRIP.

YORK, PA., July 14.—A trip to the East by C. P. Henderson, Pacific coast manager for Martin-Parry Corporation, and Elliott Higgins, formerly of the Commercial Body Company of Seattle, has resulted in consolidation of their eastern interests with those formerly controlled by the Commercial Body Company of Seattle.

The territory surrounding Seattle, Portland and Spokane are soon to benefit by the established standards and policies Martin-Parry has so successfully maintained in the East. As a result, a chain of service extending from coast to coast and from North to South is now offered to chassis dealers and in linking this with their standard of product their original hope of paralleling the commercial chassis industry is about complete.

SHIPPING UNPROFITABLE BY TROLLEY.

HARRISBURG, PA., July 9.—Trolley companies cannot handle freight profitably owing to the motor trucks and the extensions of real durable highways, according to the Philadelphia Rapid Transit Companies representatives. The company is defending its right before the Public Service Commission, to cease joint freight service in connection with the Westchester & Lehigh Valley Transit Company. This latter company wishes to have the service restored.

(Continued from Page 389.)

paid to do that. Build the road to carry the load."

And, gentlemen, I say to you that more dollars are being squandered in permitting big trucks to destroy serviceable roads in every year in the United States than is being put in new construction every year in the United States; and yet we say we are trying to solve it, by getting less miles of usable road at the end of every year than we had at the beginning of that year. I maintain, gentlemen, that it is not solving it, and it cannot solve it.

Solving the problem of the highways of the United States applies in the same degree to the total mileage of usable highways in the State of Maryland. So we have started out in our little way to see that the highways in Maryland shall be used by vehicles so designed, so constructed and so operated as not to do unreasonable damage to the public highways. And we have said, for the sake of argument, that a truck may not carry more than the weight for which it made an application and paid a fee, which in turn is based upon the weight of that vehicle.

Therefore if John Jones was an honest man and paid a license for a two-ton truck, he should be assured that the people who are competing against him are not taking out a license for a four-ton truck and paying a two-ton fee. So in common honesty we say that the trucks shall not carry more than the weight for which application has been made and a fee has been paid.

Second, a man shall not carry a load in excess of 650 pounds per inch of width of tire.

Third, that under no consideration may any motor vehicle of any kind carry a load in excess of 20,000 pounds, five tons of load perhaps and five tons of dead weight.

When that law was drawn upon the statute books of Maryland, when any man from Maryland appeared at a public conference he was hooted at, he was laughed at, and he was belittled in every way. But we fought for it; we said in Maryland

that it should not be done. And, gentlemen, I want to point to one little personal reference because it illustrates the point better than anything I know.

I attended a conference here two years ago with representatives from 28 national organizations looking toward the adoption of a uniform vehicle law for the United States, something that I believe is absolutely necessary, something I believe that you gentlemen can do a great deal to bring about, provided you do not attempt to take uniformity too far.

The question of weights came up and we believed we had sufficient votes to stop the conference from going upon record for loads greater than we believe the roads would carry. I got up and talked from the floor. One gentleman said, "Who is this talking?" Another one says, "Mackall, of Maryland." "No, it is not. "Yes, it is." "It is not." "Why is it not?" "Why, he has horns, a split hoof and a tail, and this is just an ordinary man."

On the question of uniformity, I know you people want uniformity, and I believe in uniformity. But I maintain that the roads in Podunk should not, will not and cannot carry the same kind of traffic that the streets of New York carry. I maintain it is not necessary to have in the rural sections of the State of Maryland the same type of road that we have on Fifth avenue, New York. I maintain also that the road from here down town to the city does not need to be the same type of road to carry the same type of traffic as on Fifth avenue of New York. I maintain there must be different types of road, different conditions of road and different strengths of road.

If that is so then we must have different weights for the vehicles which go over them. And we have got to have a different type of load going over a road at one season and at another season.

But, gentlemen, you did not come here to hear a tirade against the truck manufacturer, and I do not expect to do it all the afternoon, but

it does bring us to this point I think. Why have we permitted grossly overloaded trucks to be operated on and to destroy the public highways in these United States, and never have said a word? Because the same propagandists have told you about it, have said you cannot prevent it; if you limit the size of the truck you curtail the industrial expansion of the country and that you cannot do. You hear that objection and you let it go and you say that you are not going to curtail the industrial expansion of the country.

Gentlemen, I want to cite you a little incident. The road from Washington to Baltimore and Philadelphia during the war carried a tremendous amount of traffic, war traffic and all other kinds of traffic, but we called it all war traffic. Anyway, it carried enough traffic to destroy it, as every other highway on the Atlantic seaboard was destroyed during the war—destroyed so nobody could use them.

The Bureau of Public Roads, Department of Agriculture, made a disinterested study of the traffic that went over that road. We kept account of the traffic, the weights, one day a month for two or three years. But they took it for one month and they demonstrated that if all the loads of five tons or larger had been carried in units of three tons, and allowing the manufacturers rated efficiency for the five-ton unit over the three-ton unit, it would have cost those operators an additional \$15,000, and it cost the State of Maryland the tidy sum of \$600,000 to remedy the damage which was done at a saving to the operators of \$15,000.

Gentlemen, it cannot be done, and yet it is being done in every community in the United States. And, gentlemen, it is your business and it is my business. If you gentlemen can go home and say that the trucks can be regulated, that they are being regulated, that they must be regulated, you will have done a great service to the states from which you come. Just tell them that in the little State of Maryland it cost \$600,000 to repair the damage

in order that a few crooks—that is what Secretary Hoover called them—could save \$15,000. And, gentlemen, you will not have to tell them that but once.

We passed the law and then we started out to enforce the law, and again they said it could not be done. I want to tell you, gentlemen, that it is the easiest thing ever undertaken—every one of you undertake every day a more difficult task than eliminating from the highways of this country the overloaded truck. And all you need is a little portable weighing device. Two of them together will weigh about 100 pounds. You stick them in the back of a flivver and you go along the road; you find a truck that is overloaded; you weigh it. If it is overloaded then and there you take off the amount of the overload, and then take the driver to the judge and let him tell his story. That is all you have got to do—just weigh the load, take off the overload, and take him to the judge and let him tell his story.

Perhaps, gentlemen, there is no warrant in law for making him take off his overload. We maintain there is, and nobody has ever substantially maintained to the contrary. I do not believe, perhaps, there is any law which says that if you find a crook with your money you can take your money away from him, but you generally do it, don't you, and the crook never says anything. So when you find the crook with his overload you take off the overload, put it on the side of the road and let him get it as best he can.

Gentlemen, there is the whole story of eliminating overloads on highways, by means of portable devices. We started out and we had these portable devices. The first day we obtained 60 arrests and convictions. The first week we obtained something like 150. The second week we got about 50; and the third week we got 15; and the fourth week we got none. Gentlemen, of the 130,000 vehicles in the State of Maryland today not one-hundredth of one per cent. is carrying an overload at any time, simply because you have a little accurate portable

weighing device that you stick under the truck and jack up the rear end, and record the weight. And if it is overloaded you have the driver tell it to the judge.

So, gentlemen, when they tell you that you cannot prevent overloading upon the public highways in these United States, tell them you must do it, you have got to do it, and you are going to do it, that it can be done, that it has been done for a period of three years, and is going to be done as long as crooks who attempt to operate upon the public highways in the little State of Maryland insist on carrying a load greater than the law permits them to carry.

Gentlemen, if we are not going to do that, we are going to continue as we are today building roads which we can ill afford, roads which we cannot afford if they are built unnecessarily strong. Suppose, for instance, we are going to build a road a certain width, a certain depth, to carry all the traffic that wants to go over it, except motor vehicles carrying a gross load in excess of five tons, or a gross load in excess of 10 tons, or a gross load in excess of what figure you have set up. Suppose now the overloaded traffic is one one-hundredth of one per cent. of the total, and, gentlemen, it is not any more. Suppose, then, that that road costs you, say, \$20,000 a mile to build, and it generally costs that, taking the country over. The interest on that \$20,000 is so much money. The amount depends on the rate of interest. To build that road then to carry the total load will cost an additional \$10,000. The interest on the \$10,000 at $4\frac{1}{2}$ per cent. is \$450 a year. Gentlemen, I say to you that before you can justify that additional expenditure, you first must see what that additional expenditure is going to be, and if the overloaded trucks can save, not to themselves, but to the country at large, enough money to pay \$450 per mile per year, then you are justified in building a road for them. If they cannot, you are not. And, gentlemen, when we say that all the traffic that goes over a road must

earn \$900 a year, and one-hundredth of one per cent. must earn \$450, or 50 per cent., we read them out of court; it cannot be done.

So, gentlemen, unless we are going to limit the load to that which the roads will carry, and limiting by actually putting off of the highways the vehicles which are overloaded, we are going to saddle upon this country a tremendous burden in excess of the country's ability to pay, or we are going to build a system of roads too light, one which will be destroyed, one which cannot be used by anybody.

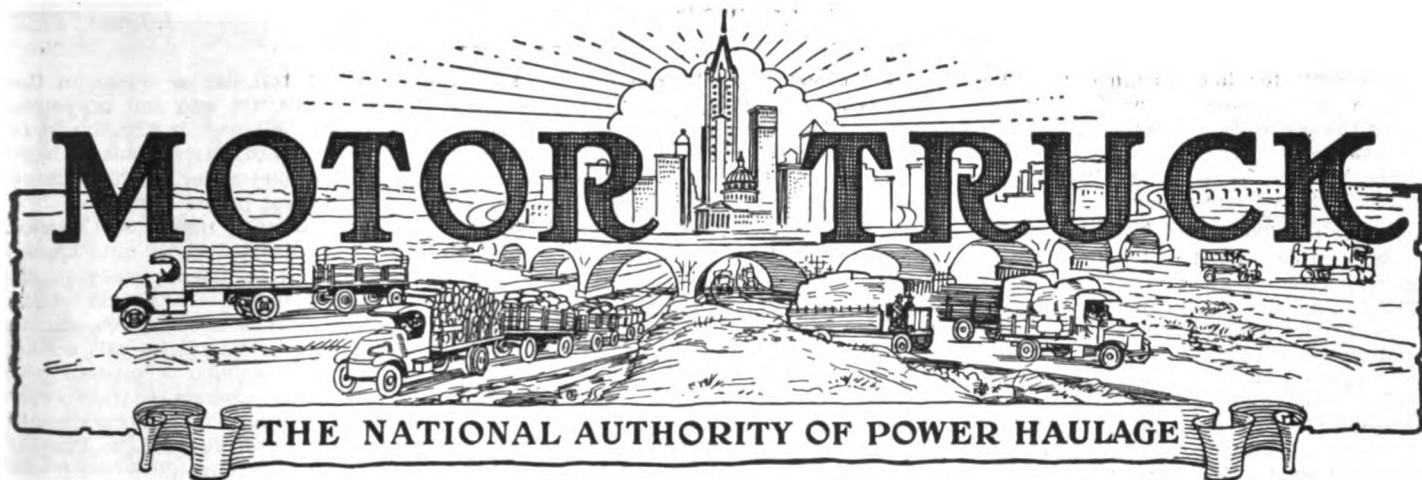
But if I understand the temper of the American public they are not going to do either one of those. And when they rise up in their might and say, "The propagandists be damned, we are going out and settle this question, we are going to solve this question for ourselves, we are going to build the kind of roads which we need, the kind for which we can pay, and we are going to take out a portable weighing device, with a couple of men as we did from Baltimore, and we are going to eliminate from this state the use of the overloaded truck," you will then begin to solve your highway problem, and I hope that is not very far distant. I thank you.

(The portable weighing device mentioned by Mr. Mackall is the Loadometer, which is manufactured and sold by the Black & Decker Manufacturing Co.—Ed. Note.)

BUS LINES INCREASE IN WISCONSIN.

MILWAUKEE, WIS., July 11.—Immediately following the Wisconsin Railroad Commission's announcement that motor buses operating as bonded carriers have increased at least 100 per cent., making the total lines in operation 126, the T. M. E. R. & L. Company of this city, the owner of the Wisconsin Motor Bus Lines, announces the starting of a motor bus line between Milwaukee and West Bend. This line will operate over highway number 15.

If the plans of the Lincoln Avenue and South Division Civic Association are put into effect motor buses will soon be operating within the city limits of Milwaukee. The public utilities commission of the Milwaukee Common Council have been presented with signed petitions in favor of the bus lines.



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PAWTUCKET, R. I.

AUGUST, 1922.

Cars and Trucks Will Protect Public If Rail Strike Becomes Serious

Hundreds of Motor Transport Lines Ready to Aid—
Major Cities Organized to Move Persons and Goods—
Trucks Already Transport Food in Some Communities.

(By CHARLES CLIFTON, President National Automobile Chamber of Commerce.)

PROTECTION for the public is assured by the motor car and motor truck if the railroad strike becomes serious.

Several of the larger cities have already prepared emergency organizations to handle the transport situation.

The National Automobile Chamber of Commerce has listed 935 motor truck lines which could be of material aid in a transportation crisis.

The country could not dispense, even for a short time, with a major avenue of transportation such as the railroads, without suffering. Study reveals the fact, however, that there are enough motor cars to handle the passenger traffic, if necessary, for an indefinite period, and that there are sufficient motor trucks to prevent acute shortage in essential supplies for 60 days. It would be possible, in fact, to maintain our large cities on a ration basis for an indefinite period.

GREAT BRITAIN found that motor transportation was a life preserver in the rail crisis of 1919. The British Road Transport Board divided the country into 12 transport areas, each in charge of a local commissioner. The public parks in London were converted into motor transport depots. Two hundred and fifty volunteer drivers were secured.

First attention was given to the milk supply. The quantity of milk going to Liverpool by motor truck on Sept. 30th was reported to be greater than the amount ever brought in in any one day by the railroads.

The mails were kept moving by motor car and motor truck. Drivers of private automobiles were given postal licenses so that the motorists might assist in the delivery of mail sacks.

The United States, to be sure, is a vastly larger area than Great Britain. On the other hand, this country has 10,500,000 motor vehicles compared with the 500,000 in the British Isles.

Demonstrates Value of Highways.

Another ray of light in the situation is the improvement of our highway system.



Colonel Clifton, Eleven Times President of the National Automobile Chamber of Commerce and Chairman of the Directors of the Pierce-Arrow Motor Car Company.

Over 12,000 miles of surfaced roads were built last year, and a larger record is being made this season. What is accomplished is but a fraction of the 180,000 miles of highways which the states and nation are planning to construct within the next 15 or 20 years. Nevertheless, the roads are in better condition than they have ever been before, which means lower transportation costs and greater efficiency.

The rail crisis, in fact, points out clearly the great importance of a well-developed system of highways, assuring the public of transportation at all times. The highways not only serve as economic benefits day by day, but they also constitute an insurance against isolation in the event of a railroad tie-up.

Enough Motor Cars for Travellers.

The movement of passengers, no matter how severe the strike, need not be seriously impeded. There is one car for every six or eight adults in the suburban districts of our cities. Hence this element of passenger travel can be readily cared for. The motor car can also be used efficiently for all short business trips, and is also possible, though less

convenient, for long distance traveling. The vacation travelers need not worry over the situation as motoring is an increasingly popular form of recreation. Over 1,000,000 persons, for instance, go motor camping every year.

Trucks to Supply New York with Food.

Surveys completed within the past few days in New York showed that a sufficient quantity of milk for the necessary uses in the household and for invalids and children could be brought in by motor trucks from distances of 150 to 200 miles. The daily consumption of milk amounts to 2,670,000 quarts. Other foodstuffs consumed daily in New York are: 5,145,804 eggs, 219,527 pounds potatoes, 434,000 pounds butter and 3,482,322 pounds of fresh and provisioned meat. The port authority of New York believe that the staple vegetables such as potatoes, onions, cabbage and carrots could also be supplied by trucks from nearby sections.

Cincinnati Milk Now Handled by Motors.

Reports from Cincinnati indicate that the milk supply will not be materially affected by the strike. Cincinnati consumes daily approximately 190,714 quarts of milk, of which less than three per cent. is brought into the city by railroads under even normal conditions.

The 3800 farmers shipping milk into Cleveland, which daily consumes about 381,428 quarts of milk, are using trucks altogether. Milk coming into Philadelphia by trucks now amounts to 64,169 quarts daily.

It is estimated that the trucks operating out of Louisville, Ken., will soon be handling 500 tons of supplies both on the out-bound and in-bound trips. Under normal conditions the trucks and interurbans handle 75 per cent. of all perishable foodstuffs in Kentucky and Southern Indiana. Louisville daily consumes 116,086 quarts of milk, 224,121 eggs, 151,405 pounds of fresh and provisioned meat, 18,869 pounds of butter and 9544 pounds of potatoes.

Indianapolis Prepared.

Daily scheduled motor truck service to all industrial centers within 75 miles of Indianapolis will be maintained. Five completely equipped transport terminals have been established. Consignees door delivery on all express and first and second and third class freight shipments will be made. Pick-up of all freight consignments at shippers' platforms will be made if such service is ordered the day prior to the date of shipment. Special service on express and all classes of freight will be maintained between Indianapolis, Chicago, Detroit, Cleveland, Columbus, Cincinnati and Louisville.

Meat Packing Will Not Suffer.

The meat packing industry will not be materially affected as 2500 head of hogs are hauled daily by trucks into the St. Joseph, Missouri, stockyards. Fifteen motor express lines for handling live-stock shipments within a radius of 45 miles of Kansas City have been established. Another Kansas City motor line is planning to extend its radius of haul to a maximum of 65 miles.

Farmers Will Use Trucks.

Farmers are using trucks extensively to bring their products to the consumer

market direct. The Bureau of Crop Estimates of the United States Department of Agriculture has discovered that the motor drawn vehicle travels 25 per cent. longer distance; makes 183 per cent. more round trips; carries 48 per cent. more corn, 50 per cent. more wheat and 83 per cent. more cotton than horse-drawn vehicles.

MOTOR TRUCK ASSOCIATION OFFERS SUBSTANTIAL AID.

NEW YORK, Aug. 15.—The Motor Truck Association of America has offered every assistance to the Port Authority of New York in all preparations to prevent a tie-up should such a condi-

tion arise. A full list of trucks in the metropolitan district and roll of volunteer truckmen are now in the hands of the interstate board. Arrangements have long been completed for vehicle assistance from distant points if needed.

Metropolitan District Has 68,000 Trucks.

With approximately 68,000 auto trucks in the metropolitan district ready to answer a call for motor mobilization within 24 hours, New York has little to fear in the event of a crisis in the rail strike, according to the opinion of experts who have worked out emergency transportation plans. The huge fleet of cars would be placed at the disposal of the Port of New York Authority for allocation if the situation became serious enough to warrant such action.

Details All Completed.

Details as to parking spaces, routes and roads to be used have been completed for some time, and all reports show that the city could be fed, and well fed, by automobile. This also applies to fuel and other necessities of life.

Hauls, which would average about 25 miles at first, could be extended easily to a radius of 250 miles. This would keep direct communication with Buffalo, Philadelphia, Boston and other important points almost as open as under uninterrupted rail schedules.

In a statement prepared by Windsor T. White, chairman of the motor truck committee of the National Automobile Chamber of Commerce, the degree to which certain products are hauled normally by motor truck to several cities outside of New York, is indicated by the following table:

City and commodity	Daily consumption	Quantity normally received by truck
Cincinnati, milk..	190,714 qts.	97%
Kansas City, milk	157,058 qts.	40%
do. eggs.....	303,223	65%
do. potatoes...	12,913 lbs.	50%
Philadelphia, milk	667,550 qts.	64,169 qts.
Atlanta, milk.....	95,357 qts.	90%
do. eggs.....	148,385	60%
do. potatoes....	7,840 lbs.	60%
Indianapolis, eggs	303,223	60%
do. milk.....	168,823 qts.	80%
do potatoes.....	12,854 lbs.	68%

"Adequate supplies of food for all major industrial centers can be supplied by the million motor trucks in the country today in the event of further suspension of railroad service," Mr. White said. "Surveys just completed in New York, Philadelphia, Cleveland, Detroit, Kansas City, Indianapolis, Atlanta, Des Moines, Louisville, Omaha, New Orleans and Baltimore indicate full protection of supplies."

Truck Dealers Offer Services.

All of the large automobile truck manufacturing concerns stand ready to lend a willing hand at any time in any emergency. This is shown by statements from some of the representatives in this industry.

All in all, those familiar with the carrying power of the automobile are inclined to smile at reports of what dire results might fall upon the city in the wake of a complete rail strike.

SECTIONAL REGISTRATIONS OF CARS AND TRUCKS IN UNITED STATES.

NEW ENGLAND STATES.

Massachusetts	378,350	311,747
Maine	78,830	67,341
Connecticut	122,846	122,695
Rhode Island	42,239	48,098
New Hampshire.....	44,076	39,064
Vermont	38,049	33,601

EASTERN STATES.

New York	834,631	658,438
Pennsylvania	732,348	631,025
New Jersey	287,859	245,634
Maryland	136,160	122,550
District of Columbia..	53,031	55,000
Delaware	22,138	19,400

SOUTHERN STATES.

Texas	452,268	444,541
Missouri	338,426	308,883
Georgia	127,799	118,573
Virginia	152,200	132,300
Kentucky	129,456	108,668
North Carolina	164,391	149,444
Tennessee	120,000	102,800
South Carolina	84,985	85,272
West Virginia	90,454	85,166
Florida	203,207	90,829
Alabama	87,687	77,076
Louisiana	80,000	70,000
Mississippi	58,240	54,114
Arkansas	75,500	58,700

MIDDLE WESTERN STATES.

Ohio	779,050	677,000
Illinois	682,648	587,588
Iowa	450,622	433,000
Michigan	497,745	432,126
Indiana	426,650	351,197
Minnesota	343,000	324,166
Wisconsin	364,829	297,850

WESTERN STATES.

Kansas	290,256	265,558
Nebraska	218,297	213,350
Oklahoma	203,800	180,000
Colorado	139,727	121,502
South Dakota	111,929	113,700
North Dakota	89,303	86,986
Montana	53,032	51,873
Wyoming	27,555	30,000
New Mexico	20,450	.....

PACIFIC STATES.

California	737,152	604,024
Washington	191,520	170,704
Oregon	109,001	102,274
Idaho	47,794	46,730
Utah	81,956	41,945
Arizona	32,847	31,551
Nevada	10,903	9,822

The Value of Quick Stock Turnovers*

(By G. W. HAFNER, Manager, G. W. Hafner, Inc., Auditors and Industrial Engineers, Chicago.)

THE interest of every business man is, naturally, to make his capital do as much work for him as possible. That means letting a given dollar rest in a given lot of material for as short a time as possible. And doing this means moving stock as rapidly as possible. And the one word that covers all this is "turnover."

It is never possible to make money on dollars that are tied up in commodities that will not move. And

when prices are falling, it is easy to lose a great deal of money by holding onto merchandise or materials that move slowly, while the price for which they can be sold becomes constantly less and less. Because of this every manufacturer and merchant ought to have information on the movement of goods in and out. It is this movement in and out, not only of the merchandise itself, but also of that which the merchandise represents, money, to which the term "turnover" applies.

IN ANY business there are two things that are disposed of, replaced and disposed of again; or in other words, "turned over." These are:

1. The stock of merchandise.
2. The money invested in such merchandise.

And the turnover of these items has a very definite effect upon the profits which the business makes during a given period. Hence an analysis of this effect is necessary in order to plan properly and conduct the business so as to:

1. Secure the maximum profit with a given capital, or
2. Secure a given profit with a minimum capital.

Quick Versus Slow Turnover—Perhaps the easiest way to state the case for a rapid rate of turnover in business is as follows:

A certain business, we will say, has annual sales of \$50,000,000 and makes a gross profit of \$17,500 (or 35 per cent. of the sales). If we take off \$12,500 for expenses (25 per cent. of the sales) the net profit would be \$5,000 (or 10 per cent. of the sales). But if the annual sales of that business is increased to \$100,000 and a gross profit of 35 per cent. is still realized, the amount of gross profit would be \$35,000. Suppose expenses of the business are doubled because of this increased business—a very liberal margin—there would then be \$25,000 in expenses to deduct from the gross profit of \$35,000, leaving a net profit of \$10,000.

Now it is at once evident that, having increased the sales to such an extent, the same percentage of profit is not required. The tendency in any business should be to increase the turnover and thereby decrease the percentage of profit. Under these circumstances the nation as a whole would benefit, and the individual engaged in the business would certainly not suffer.

Another illustration: Two men are engaged in building construction. John Smith, the first contractor, finishes 12 jobs a year, making \$1000 net profit on each job. He earns a total of \$12,000. Jim Jones, the second contractor, finished 18 jobs a year, making \$750 on each job. He earns a total of \$13,500. Moreover, he gets business away from Smith because his price is more attractive. When there are none too many jobs

BUSES WILL SAVE SOUSA'S BAND \$60,000.

ABOUT \$60,000 will be saved by Lieutenant Commander John Philip Sousa and his band during its forthcoming tour of 20 weeks through the use of buses as a means of transportation. It is anticipated that under this arrangement no time will be lost in the transportation of baggage for the bandmen.

to go around at best this last consideration is of great importance.

Making Your Dollar Active—If a dollar earns 10 profits for its owner in a year, the owner can afford to take a smaller profit each time than on another dollar which earns him, say, only five profits during the same length of time. And yet the dollar which returns the smaller rate of profit will bring in the larger volume of profit, simply because it is so much more active.

Now, this is precisely the point that most business men seem not to understand. They do not seem to be able to grasp the fundamental principle that even though the percentage of profit on merchandise or service be but, say, five per cent., if it is earned often enough, say, 10 times in a year, the annual turnover on money or rate of profit on investment will be 50 per cent.

Too many merchants overlook the fact that their cost of doing business of, say, 25 per cent., cannot correctly be used to demand a 15 per cent. margin of profit on each and every kind of merchandise sold, because it is the percentage of profit on one sale and not on the year's investment. A larger margin of profit needs to be added to the slow moving materials and a smaller margin to the quick moving.

The vital point of comparison is how much profit can you make a dollar earn selling a given article. Any business man can get rich earnings a five per cent.

margin of profit on one certain commodity, if he sells it often enough; on the other hand, he may go bankrupt on merchandise offering 100 per cent. profit, if he rarely makes a sale. Quantity selling is the greatest modern profit policy. The profit on any one article or commodity is not much, but when this profit is multiplied by 1000 or 5000 or 10,000, the profit on the volume becomes considerable.

Lazy dollars, unnecessarily high profits, and sluggish business, all tend to go together. The business man who makes money in spite of conditions—and there are many such—are those who go out aggressively to make their dollars active.

How to Find the Rate of Turnover—The rate of turnover for a given time depends on just two things:

1. The average amount of money invested in the merchandise.
2. The sales of the merchandise in the period.

Both amounts must be stated in the same terms in order to get a correct result. That is, the average amount invested must both be figured at the cost price, or at the selling price. It does not matter much which way they are figured, so far as the accuracy of the result goes; but it does make a decided difference if one of the elements is figured at one price, and the other at the other price. The result in that case is a figure that means precisely nothing.

It is obvious, then, that, since these two elements only are involved the problem of increasing the rate of turnover depends on these two and no others. Hence one or both of two things must be done:

1. The average amount of money invested in merchandise must be decreased, relative to the volume of sales; or
2. The sales must be increased, in a greater ratio than the increase in the merchandise investment.

The rate of turnover may be found by dividing the yearly net sales by the equivalent merchandise investment.

By "equivalent merchandise investment" is meant a constant yearly investment in merchandise which is equivalent to the actual merchandise investment over a period of one year.

This means that the "equivalent merchandise investment" must be expressed in terms of times as well as of money.

(Continued on Page 456.)

The Motor Vehicle Clutch

Describing in Detail the Important and Most Popular Types of Devices Which Permit the Engine to Be Connected with or Disconnected from the Transmission of the Car

A CLUTCH is required with a gasoline engine because this prime mover is dependent upon its own momentum for making the power which causes it to operate. In the steam engine the fuel is burned at the boiler and generates steam. This is conducted to the engine, where its energy is used. A large reserve power is thus provided which may be used in starting. After it has once been started the gasoline motor takes the fuel into the cylinders and the combined action of the pistons and flywheel compel it to impart its energy to the machine. If the engine was directly connected to the car it would be unable to overcome the inertia of the conveyance, but by installing the clutch the load is applied gradually to engine.

THERE are three types of clutches, all of which appear to have met with decided approval in the automotive industry. These are known as the cone, disc and the plate types. All of these three types are employed by the present day manufacturers of automobiles. There are special clutches made for some machines, but the great bulk of clutches may be classified under the three types mentioned.

at first, but gradually take up the load until at last the two parts are connected. This compels the transmission to revolve with the engine and so drive the car.

The Cone Clutch.

The cone clutch was one of the first successful clutches developed and is still used quite extensively in an improved design. Usually in the car equipped with this type of clutch the female side into which

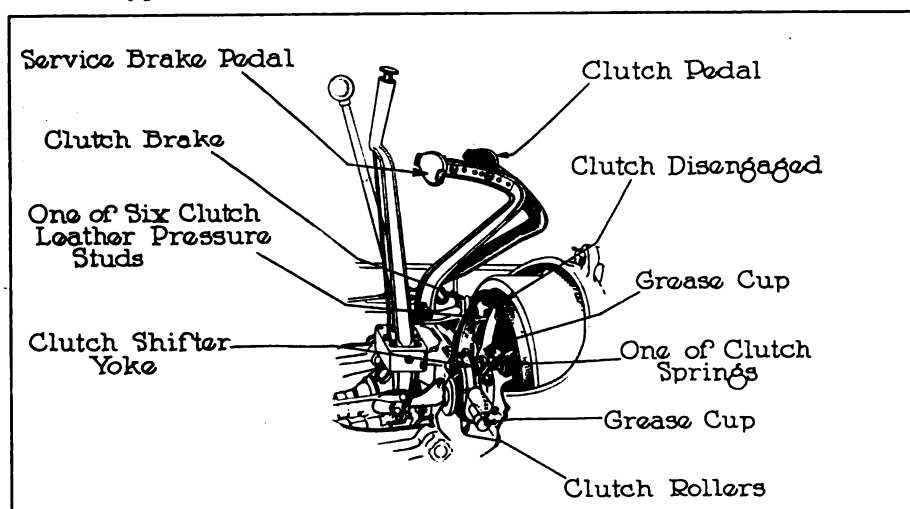
plied to the spring that holds the two sections of the clutch together when engaged.

Another feature of this type of clutch, in its improved form, is the installation of clutch leather pressure studs. These studs are used to raise the leather facing a slight amount above the rest of the surface at the point where the stud is located. This has the tendency to prevent the clutch from "grabbing" or from taking a too strenuous hold when first let into contact with the female part.

A clutch brake is a decided aid to the operator in shifting the gears, by preventing the revolving of the male member by its own momentum, after being disconnected from the engine. If properly adjusted this also saves chipping of the gears and the corresponding clashing when shifting.

The clutch pedal by which the clutch is operated is connected to the clutch shifter yoke by means of bell cranks. This yoke usually is constructed with two shoes which fit a groove machined in the hub of the male part of the clutch and the thrust of these shoes is usually taken by ball bearings, one on either side of them.

The operation of this clutch is very much improved by keeping the leather facing in a soft and pliable condition, and also by keeping the clutch leather pressure studs properly adjusted. The condition of the leather may be kept in proper working order by the application of neatsfoot oil at frequent intervals.



The Cone Clutch, One of the First Types Developed, Is Used Extensively.

Each of these clutches has two distinct parts: One is attached to the crankshaft of the engine while the other part is attached to the main shaft of the transmission. When we speak of the clutch as being "thrown out" we mean that these two parts are separated from each other and that the engine may be run without causing the car to move. When the clutch is "in" these two parts are forced against each other, usually by a coil spring, which allows the two parts to slip

the cone engages is incorporated in the flywheel, the surface of the cone, which bears against the flywheel being covered with leather to afford a good gripping surface.

The forward end of the male member of the clutch rotates in a bearing formed in the hub of the flywheel; in this way it is kept in perfect alignment, while at the same time it may revolve entirely independent of the female member. An adjusting nut is also provided which allows more or less tension to be ap-

When it becomes necessary or advisable to adjust the clutch leather pressure studs, the clutch should be withdrawn and turned until one of the studs is at the top, or in such a position that it may be easily worked on, a chalk mark should then be made at this point. The clutch pedal may then be blocked in the withdrawing position and the stud adjusted. By using a feeler or thickness gauge between the top of the leather and the inside surface of the female part of the clutch the amount this stud has been adjusted is easily determined. The male part of the clutch should then be turned to another stud and an adjustment made which will make the measurement the same as that of the first stud. This operation should be repeated until each of the pressure studs have been properly regulated.

Some of the older automobile models having this type of clutch are not equipped with these pressure studs and many owners have obtained the same results by inserting beneath the leather facing at equal intervals thin strips of metal which raise the surface at each of these points. The clutch brake should be kept adjusted and in good condition. This part of the clutch mechanism is often neglected and many a car is charged by its owner with having a poor gear shift when the condition could be corrected by attending to the clutch brake.

Multiple Disc Clutch.

Another satisfactory clutch which is incorporated in many of the modern cars is composed of a series of discs which are attached to the engine shaft while another series of smaller discs are attached to the transmission shaft. When the clutch is engaged a spring compresses these plates together, with sufficient tension to prevent slipping when fully engaged.

This type of clutch may be constructed to operate continually in oil or it may be designed to function dry.

Dry Disc Clutch.

A clutch which operates on the same principle as the lubricated disc type is also manufactured, but it re-

quires no lubrication for its proper functioning and this is known as the dry disc clutch and it is used in many cars. The driving discs are attached to the engine flywheel and are covered on each side with some kind of friction material, mostly composed of asbestos.

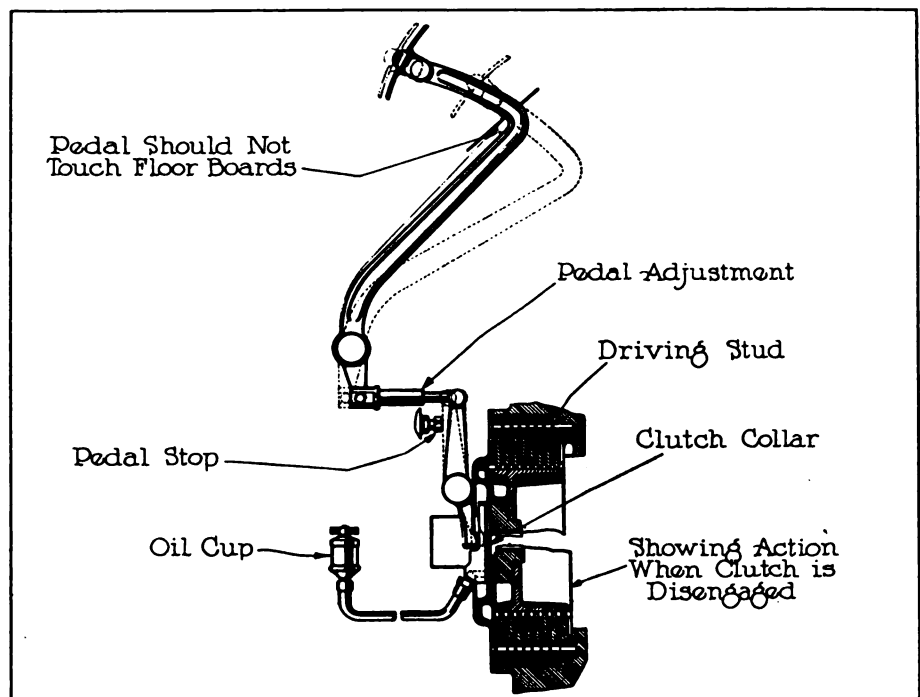
The driven discs are not covered and are attached to the transmission shaft. On this type there are no adjustments to make excepting that of regulating the position of the clutch pedal occasionally, to compensate for the wear on the clutch facing of the driving discs.

Lubricated Disc Clutch.

If oil is used it flows between the discs when the clutch is disengaged, but when the clutch is let "in" the tension of the spring squeezes the oil out from between the discs,

the flywheel of the engine, while the steel discs are keyed directly to the transmission shaft. In order to cause the immediate release of the two parts, when the clutch pedal is depressed, some makers insert small steel springs between each of the driving plates, which prevent to a great extent any cohesive action by the discs. An adjusting nut is usually installed which acts against the clutch spring, putting more tension on the discs by screwing it against the spring or relieving the tension by backing it away.

When a car is equipped with a lubricated disc type it should be kept well supplied with the proper mixture of lubricant. Many manufacturers specify a half and half mixture of good engine oil and kerosene, which has been found by experi-



Lubrication Disc Clutches Are Installed on Many of the Present Day Cars.

while this is taking place the clutch is slipping, but as soon as it is entirely removed from between these discs the clutch becomes practically a solid unit and the car is moved along at a speed corresponding to the revolutions of the engine.

When the clutch is disengaged the tension of the spring is removed and each series of discs revolves independent of the other.

Some manufacturers use both bronze and steel discs. Those constructed of bronze are attached to

mentation to give satisfactory results.

Often if the amount of kerosene is below this proportion the clutch will start slipping. This may be easily remedied by the addition of more kerosene. If the clutch has a tendency to act harshly or "grab" it may often be remedied by adding a small amount of engine oil to the mixture.

In another clutch of this type the manufacturer uses cork insertions in

(Continued on Page 436.)

COMMENT OF THE DAY

NO TIME FOR QUIBBLING.

SHAY'S Rebellion, if a somewhat rusty memory can be trusted, occurred in Massachusetts somewhere about 1786. In effect it was an uprising against state governmental authority; an uprising that the state, regardless of what the outcome may have been, because of certain existing Federal laws was forced to cope with unaided by the government of the nation.

Truly an unusual state of affairs and one that led George Washington to write to a friend who had requested that steps be taken to quell the uprising by force: "You talk of using influence to appease the tumult in Massachusetts. Influence, my dear sir, is not government; but let us have a government by which our lives, liberties and properties will be secured—or let us know the reason why."

A year ago we might have read the foregoing and marveled at the spectacle of American citizens countenancing legislation that in any way would have made it possible for such an insurrection to take place—and yet today we find ourselves in a position fundamentally analogous to that which confronted Massachusetts in 1786—because the strike of the railroad shopmen, originally and ostensibly directed against the railroad operators, has developed into a strike against the government for the simple reason that the people are the sufferers from this strike—and the people are the government. Somewhat ambiguous but a fact nevertheless, as careful study of the situation will show.

Already transportation of foodstuffs and other essentials is hampered and in many parts of the country entirely tied up. Worse than this, millions of dollars worth of railroad property have been destroyed through arson, collision and accident, and to cap the climax, innocent persons have been killed and maimed, the whole, while not directly traceable to the strikers, nevertheless being generally regarded as the outgrowth of the strike.

There should be no legal restrictions to prevent the United States government from taking a hand in crises of this kind—and there are none.

Political affiliations, influence in high places and other considerations should be swept aside

and those in authority should act in a manner definitely to settle matters, regardless of whether the railroad operators or the strikers suffer most in the final summing up.

As matters now stand the "simple question of seniority" as one ingenious writer puts it, is the only stumbling block to a speedy settlement—but this "simple question," involving as it does vast sums of money on both sides of the case, is through events become the most important feature of the strike. It transcends all others in importance and as things have worked out will be the big factor in the final settlement of the case.

There are in all probability thousands of men (the exact figure is not available) among the strikers who after working years for the railroads were nearly ready to retire on a pension when the strike came. As we read the news, if the seniority privilege is quashed, these men, most of them well along in years, will entirely lose all credit for the time they have been at work and must start again as though they were new employees of the railroad. If this is the fact, and we believe that it is, they are in effect confronted with the spectacle of seeing their entire savings of years (for that is what the pension would amount to) swept away and—without discussing the reason for their going out on strike—one can hardly blame them for refusing to go back as new employees.

They have nothing to lose by carrying the strike through to a finish and everything to gain.

On the side of the operators we find that they would save millions of dollars by refusing these men their priority rights and the money thus saved or gained assuredly would help the black side of the railroad ledger in the years to come.

There is another angle, one not frequently commented on, and this is the fact that the railroads in hiring so-called strikebreakers guaranteed them seniority over the old employees; it would be interesting to know how, after making this promise they would go about getting out of it; and failing, how they would be able to take back the old employees and accord them full seniority rights.

The whole affair with its too numerous rami-

fications presents difficulties that preclude an early settlement it seems; but, nevertheless, the authorities at Washington are squarely confronted with their responsibilities in the matter and should act at once to see that people are fed, and that lives and property are protected. It's no time for quibbling.

The people of the United States at first apathetically interested in the cause of the strike are now vitally interested in the effect of the strike and it won't be long before a demand will go forth that even the most hardened legislator will have to heed. Shay's Rebellion will be looked on as an alley fight as compared to what may take place in this country if the strike goes on for another month.

"A SAD AND TWISTY TALE."

ACCORDING to testimony offered at the recent hearing on the gasoline situation conducted by a sub-committee of the Senate Committee of Manufacturers, the refiners of the United States, taken as a whole have produced gasoline and other petroleum products at a loss for the last 33 months—nearly three years—this due to the fact that it is necessary in producing one barrel of gasoline also to produce four barrels of crude oil and other by-products, fuel oil, the principal by-product, selling at all seasons at prices below the cost of crude at the wells.

This is one reason for the high cost of gasoline and indeed is ample evidence to cause one to believe that the cost of fuel will continue to mount in direct ratio to the increase in the automobile census—because the cost of gasoline, due to the fact that the fuel oil is produced at a loss, is simply bound to increase as the production of fuel oil mounts.

In other words, if the producers were manufacturing one barrel of gasoline with the attendant several barrels of by-products, the principal one of which after extensive handling must be sold at a loss, they would be proportionally better off than as though they were handling two barrels of gasoline with the attendant by-product, as the more they produce the more they lose.

This perusal of upside-down statistics is the stuff that makes men take to hair shirts and solitude and it isn't wise to read too much of them—but anyway it's the reason for the high cost of gasoline.

And here's the proof that there is absolutely no chance for price fixing to enter into the matter; in 1913 the independent companies produced only 6,000,000 barrels of gasoline out of a total of 26,-

000,000 manufactured that year, a production which, according to the National Motorists' Association, would be insufficient to supply the cars and trucks now being operated in New York state alone.

In 1921, however, things had changed materially; the total production of crude oil in the United States and Mexico was 659,000,000 barrels, of which the so-called Standard interests produced only 20 per cent., the total production of crude oil for that year in the United States alone being 469,000,000 barrels, only 24.3 per cent. of which was produced by the Standard interests. This year, to date, the independent interests have produced 55 per cent. of the total amount.

The foregoing shows why the price of gasoline is high, just as it indicates the reason why there can be no fixing of that price.

And yet somehow or other one cannot be blamed for feeling vaguely uneasy over the quality of the proof offered.

In the first place it seems absurd that hard headed business men will continue in an industry that is operated wholly at a loss when the way in which to be assured of an immediately available good profit is so obvious—simply to throw away the fuel oil and sell the rest.

In the second place it seems hard to believe that these same business men will court sure business suicide by lessening their profits; and yet within the last few days (since the inquiry was started incidentally) the price of gasoline has dropped two cents a gallon.

The third reason lies in the fact that even though the oil companies have been producing their product at a loss for nearly three years, the stock market seems to hold them in rather a favorable light—for some reason not clearly apparent.

Perhaps like certain saloon keepers who sell only "soft drinks," these producers are holding on hoping for a return of the "good old days," which in their case would be the period when only a few automobiles were in use, thus making it possible for them to make a lot of money through producing only a limited amount of fuel oil—and still this argument somehow seems upside-down.

Yes there's something unsatisfactory to the thinking man in the evidence thus far presented.

There are but 12 men in the United States who can understand Einstein's theory of relativity it is said—perhaps at least one of them can satisfactorily define the present status of the gasoline situation. To us it's a "sad and twisty tale."

The Republic Road Builder

THE 1922 road building programme is the largest ever undertaken. Federal aid funds amounting to \$75,000,000, and the available funds voted for and bonded in each state make a total of approximately \$1,000,000,000 to be expended during 1922. Positive assurance is not lacking that for the next five years appropriations for highway work will equal, if not surpass, 1922's programme.

The result of so vast a road building programme has been the demand on the part of contractors for

faster and more efficient transportation equipment in order that projects under way may be completed on schedule and with greatest possible economy.

To meet this demand for specialized equipment the engineering staff of the Republic Truck Sales Corporation has designed the Republic road builder truck, specifically adapted to the requirements of contractors using the very latest and approved methods of concrete highway construction.

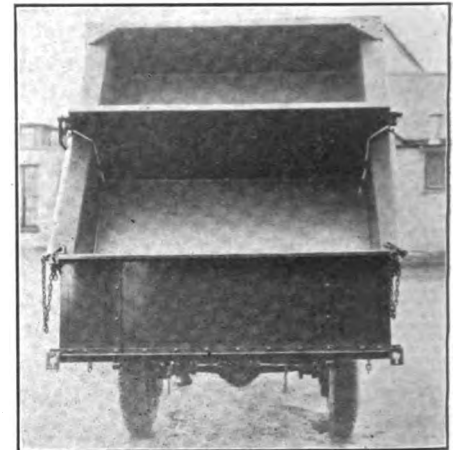
IN ORDER to provide the manoeuvring ability so necessary in operating over sub-grades, the chassis has a wheelbase of only 110 inches with a turning radius of 15½ feet, and is equipped with pneumatic tires. The carburetor is equipped with a special air cleaner to prevent dust and grit from being carried into the engine cylinders. A vacuum gasoline system assures steady flow of fuel to the last drop, and a special low gear ratio enables the truck to negotiate sand and mud roads without difficulty.

The body is mounted comparatively low to the ground, and is well balanced over the rear axle, with approximately 40 per cent. of the total load carried on the front wheels.

Three designs adaptable to the various methods of construction in use

by road contractors have been worked out. All are of two cubic yards capacity.

The standard rear discharge type is fitted with an under-body hydraulic hoist, and a center, swinging partition, controlled by the driver. This body is intended for use in connection with a central proportioning plant. At the storage bins this truck receives two measured batches of sand, gravel and cement, each in its separate compartment, and proceeds to the point where the concrete mixer and paver are in operation. By reason of the short wheelbase, it is unnecessary to use a turntable. Approaching the mixer, the truck travels close to the right side forms; then turns sharply to the left and reaches the skip, ready to discharge its load, in one backing operation.



Showing Arrangement of Double Acting Tail Gate and Swinging Partition.

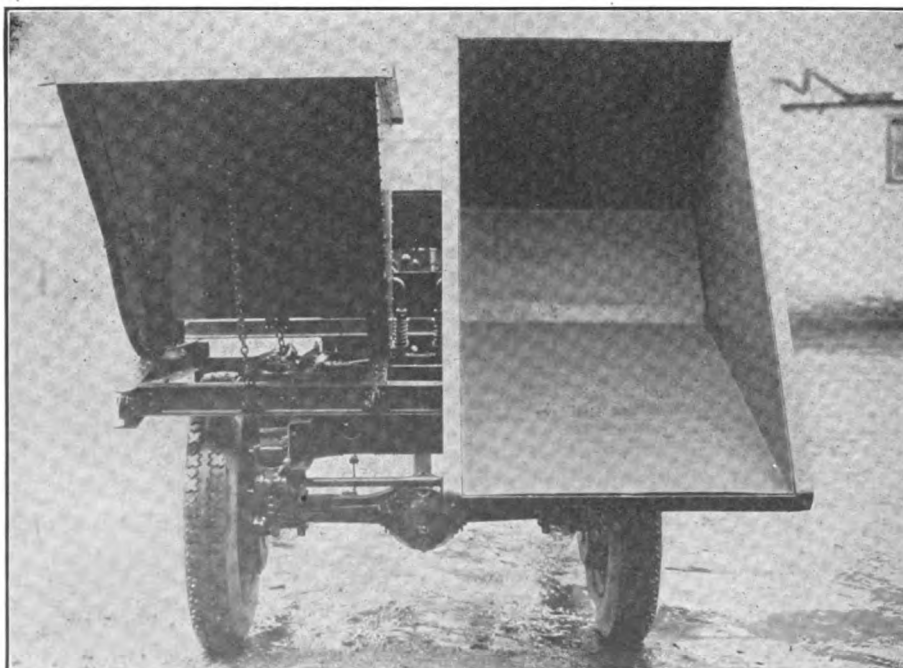
Each compartment is then dumped into the skip as fast as the mixer can handle it.

This dumping operation takes only a few seconds, and the driver passes out along the road on the opposite side from his approach to the mixer, thus leaving room for the next truck to dump its load. The pneumatic tires on the Republic Road Builder do not break up the sub-grade, as would solid tires, which are now prohibited by highway engineers.

A fleet of five or 10 Road Builders is recommended for laying concrete roads of five to 10 miles in length, in order to insure continuous service from the storage bins to the mixer.

For the wet mix system, where the sand, gravel and cement are mixed first and then carried to the road slab, a different type of body is furnished with the Republic Road Builder.

This body comprises two gravity end dump hoppers, each having a capacity of one cubic yard and de-



Special Design of Body for Road Builder with Independent Compartments.

signed especially to handle a wet mixture. The dual hopper truck receives its load at the central mixing plant and proceeds to the road, where the truck turns and dumps its load in the same manner as with a central proportioning system.

Each hopper may be dumped instantaneously by the driver without leaving his seat. By pulling a lever the hopper is released and the weight of the load automatically dumps the body, which is built on a radius with the center of gravity behind the pivot center. After the load is dumped the hopper is tipped back by hand and automatically locks itself.

A third body option provides for mounting two batch boxes of one cubic yard capacity, so that contractors may use existing equipment if preferred.

The Republic Road Builder is also for building hard surface gravel roads, as well as for concrete con-

struction. Contractors have also found it useful for hauling gravel from the pits and stone from the quarries to the crusher.

Fleets of these Road Builders are in operation in Illinois, Michigan and North Carolina. The Davis-Wilcox Construction Company, Charlotte, N. C., operates a fleet of five.

The Knoll Construction Company, also of Charlotte, is using Road Builders in connection with the dry mix system over an average haul of seven miles.

The Powell Paving Company, Blithe Brothers and the Mulligan Construction Company, all located in North Carolina, are successfully operating fleets on concrete construction, and report a gratifying record of uninterrupted and economical operation.

COUNTRY'S LONGEST MILK ROUTE NOW USING TRUCKS.

THE longest milk route in this country, if not in the world, is now using 1500 gallon glass-lined thermos tanks mounted on trucks. It is reported that these tanks eliminate a large percentage of leakage loss. The milk arrives at San Francisco at a temperature only two degrees higher than when it was received in tanks at the cooling station, thereby keeping the growth of bacteria down.

BUILD ROADS OF RUBBER

EXPERIMENTS are being carried out by the Colombo municipality in the use of rubber as a road surface dressing, says Consul Vance, Colombo, in a recent report to the Department of Commerce. The dressing, which is the invention of a Ceylon rubber planter, is now being used on a portion of Darley road,

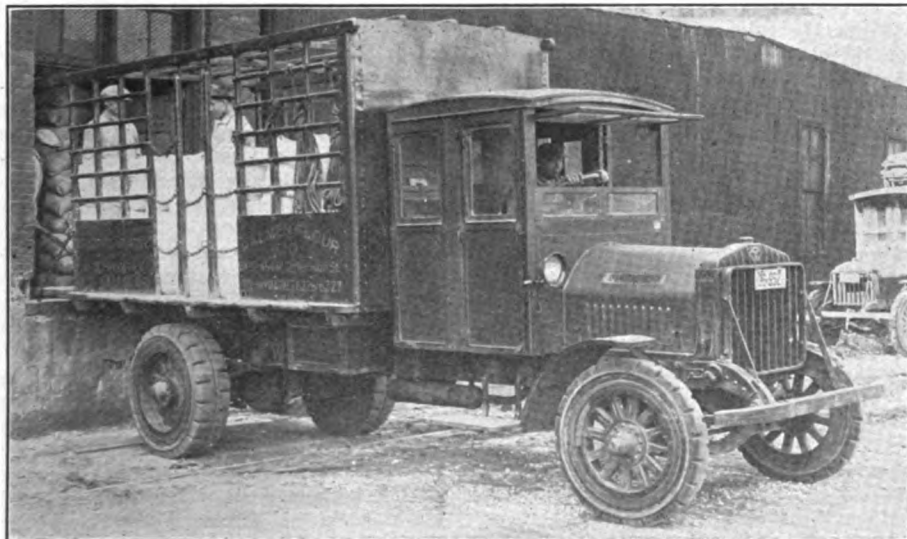
which is one of the most used thoroughfares in Colombo. This solution was first tried on a road of the Deviturai rubber estate, where it has been in use for the past 13 months. A short stretch was later laid in the municipality of Galle. The present test, however, is the hardest to which the new solution has been put.

THE solution is made from pure bark and scrap rubber. The experiments so far show that this solution is easier to handle than tar. It is a secret formula and the inventor is still working toward its perfection.

The idea of using rubber for roads has been almost exclusively confined in the past to rubber blocks, the cost being very high. The cost of the liquid rubber road dressing is 50 to 75 per cent. more than that of tar, but it is found that a

tar dressing in Ceylon must be renewed every three or four months, while rubber dressing is expected to last from eight to nine months or longer. It is anticipated that a slight difference in the cost of material, in favor of the rubber dressing, will be found that labor cost will be reduced 50 per cent. at least, and that a better road surface will be procured.

THE DIAMOND "T" TRUCK



Sturdy Construction and High Grade Units Make This a Real "Power-Hauler."

BUS RECEIPTS INCREASE HALF MILLION.

An increase of more than \$500,000 in the receipts of Newark's jitney buses was announced recently by City Commissioner John Howe, director of revenue and finance, for the first six months of the present year, over the corresponding period of last year. The 402 buses operating in Newark carried 86,740,810 passengers during the first half of this year, an increase of 12,406,817 over the first half of last year. The receipts for the six months this year were \$1,885,547.41.

LEGAL POINTS

By SAMUEL WANT

IN A recent Illinois case the evidence showed that the automobile in question was owned by the father of the boy who had been driving it at the time of the accident. The car had been purchased for the general use of the family, and at different times various members of the family used it. On the occasion in question the boy was using the car for his own purposes. He had not asked his father's permission to drive it, but his father had known of the boy's habit to take the car for his own use whenever it was available. Upon this state of facts the court decided that the father was not responsible for the negligence of his son in driving the car and injuring a pedestrian.

AN EXTREMELY important decision has just been handed down by a federal court relating to automobile dealers and manufacturers whose business extends into two or more states. An Ohio corporation had its principal office in Michigan. It held a contract with a well known maker of automobile wheels for the exclusive agency for the distribution of the wheels throughout the United States. About half of the sales made under this contract were to firms in Michigan, and the balance of the business was distributed over several states.

A statute of Michigan requires all foreign corporations to file certain statements, and to pay certain annual fees based upon the amount of property or capital used in carrying on business within the state. Failure to comply with this statute involves various penalties, and in addition prevents the defaulting corporation from resorting to the courts of the state for the purpose of enforcing any rights or claims it may have. But by its express terms and also under the restrictions of the United States Constitution, this statute can have no application to interstate commerce, or to corporations whose business is of that character in the main.

The corporation in question did not comply with the statute. It claimed that it was an interstate commerce corporation, and therefore immune. After it had carried on the sale of wheels under the above stated circumstances for about two years the wheel company repudiated its contract, and refused to furnish any more wheels. Suit was then brought by the Ohio corporation in the federal court for Michigan for the recovery of damages. The question of its right to sue was raised, due to its failure to comply with the statute.

In disposing of the company's contention that it was not subject to the statute, because of its interstate character, the court decided that while the company was undoubtedly engaged to some extent in interstate commerce, it was never-

theless a non-resident corporation doing business within the state, and as such was bound by the terms of the law. Its interstate business could not be taxed or regulated as such, but the fact that it did local business also brought it within the terms of the law to the extent of such business.

As a consequence of this ruling the company was not permitted to maintain its claim for breach of contract.

IN A recent New York case it appeared that a man was invited to become a member of a deer hunting party. He accepted the invitation of another member of the party to drive to the appointed place in the latter's automobile. An accident occurred during the trip, due to the negligence of the driver, who was the host. The suit was brought by the guest against his host for the recovery of damages for his injuries. By way of defense to the claim it was argued for the latter that the trip was really a joint enterprise or outing, and the rule of law was invoked that under such circumstances the participants in the joint affair cannot sue for the negligence of one of them. The court decided that while the law held joint participants equally liable for the acts of each, when claims were made by or against them with respect to third parties, it did not debar one of them from holding the others responsible for their negligent or wrongful acts which resulted in his injury. Hence damages were awarded against the car operator.

THE broad principle of law, discussed in preceding articles, that the motorist is not liable in damages to persons injured in an automobile accident unless there is specific evidence showing negligence on the part of the motorist, is illustrated in recent decisions dealing with accidents due to skidding.

In this connection it is important to keep in mind that the legal requirement of the proof of negligence can be met usually only by showing that in some specific detail the motorist failed to observe some usual and reasonable precaution, and that this failure on his part was the primary cause of the accident. In this light it is obvious that to drive over macadam roads at the usual rate of speed on a wet day, without equipping the wheels with chains would be evidence of negligence if the car skidded when getting out of the way of another vehicle or when otherwise proceeding in the usual course of travel. On the other hand, the absence of chains would not be considered negligence—there being no legal requirement that chains must be used—where the car proceeded at a low rate of

speed so as to guard against the danger of skidding as far as possible.

Recent cases decided in England and in Massachusetts are illustrative. In these cases cars skidded when trying to avoid other vehicles. The roads were narrow, wet and greasy. The cars skidded into electric standards, causing them to fall over and injure pedestrians on the sidewalk. At the time of the accidents the cars were proceeding at about the rate of five miles per hour and were not equipped with chains. The courts decided that the motorists were not responsible to the injured persons.

IN ANOTHER recent case decided in New York the purchaser of an automobile found that representations which had been made to him by the seller were false. He therefore offered the car back to the seller and demanded the return of his purchase money. The seller refused to make amends and the buyer notified him that he was storing and insuring the car at his, the seller's, expense and risk. Suit was also brought for the recovery of the purchase money paid. This suit was won by the buyer, but while it had dragged through the courts the charges for storage and insurance had mounted to \$700 or more. A second suit was brought by the buyer to recover this item. While the policy of the law is to refuse to permit a second suit to be brought for an item which was fairly involved in a claim previously sued upon, even though it was not specifically mentioned in that suit, the court in this case held that the rule of law did not apply, especially in view of the fact that the amount of the storage expenses could not be determined until after the first suit had been disposed of, so as to fix definitely the question whether the buyer's claims of misrepresentations were well founded.

ONE result of the traffic in stolen automobiles, with its attendant losses to innocent purchasers, has been the formation of companies for the purpose of insuring the title to cars. In addition to examining the title to cars for prospective purchasers, a New York company advertises that it will issue certificates of ownership to present owners so as to facilitate sales by them in the future, when their title might be called in question.

In view of the rule of law that the purchaser of a car which has been stolen may be compelled to give up the machine to the true owner, without having any means of recovering the purchase money paid, it behooves the purchaser of a used car to have the title to it examined with the same care as is used in examining the title to real estate.

A RECENT decision of a federal court involves the liability to forfeiture of an automobile used for illegal purposes without the knowledge or consent, express or implied, of the owner. In this case the car had been entrusted to an employe of the owner to be used in transacting the usual business of the latter. The employe secretly used the car to transport, on his own account, some liquor on which the federal tax had not been paid. This is made a ground of forfeiture by the United States statutes, and the only question in the case was whether the forfeiture could be enforced as against an innocent owner who had no part or interest in the violation of the law. The court decided that the machine was subject to forfeiture under the facts stated.

This case should not be confused with the question of the forfeiture of an automobile for carrying liquor in violation of the prohibition statutes. As heretofore pointed out in this series, an automobile so used is declared to be liable to forfeiture to the United States subject to the application of the proceeds of sale of the car first to any liens thereon, and then to the payment of the costs of the forfeiture proceedings. Any balance remaining goes into the treasury of the United States. Of course, the question decided in the above case also can arise under the prohibition law, and, in fact, is now pending in the United States Supreme Court.

A FEDERAL court has recently settled a perplexing question of bankruptcy law. In this case the holder of a lien on some cars of a bankrupt purchaser filed a claim in the bankruptcy proceedings for the amount of his bill. He also filed a petition claiming his right to the possession of the cars under his lien. The latter claim was contested by the general creditors on the ground that the filing of the monetary claim waived any claim that might exist to the cars in specie. The court decided against this view, taking the position that a lien claimant does not have to risk loss by filing only his lien claim. If he did so and finally lost out, it would be too late to file his monetary claim. Hence he may file both claims at the same time.

THE seizure recently of an automobile engaged in the illegal transportation of liquor in Michigan has called special attention to those phases of the so-called "Volstead act," officially known as the "National Prohibition act," which directly effect owners of automobiles.

Under the provisions of the law in question there are two sets of conditions under which an automobile is subject to seizure and confiscation. Under section 21 of the act, any vehicle in which intoxicating liquor is sold, manufactured, or kept, is subject to seizure, and if owned by the violator of the law, may be sold and the proceeds applied to the cost of the prosecution. If the vehicle belongs to someone other than the violator of the law, the right to condemn the machine depends upon whether the

owner knew of the unlawful use that was being made of it.

Under section 26 of the act, where an automobile is found in use for the unlawful transportation of liquor, it may be immediately seized and sold in accordance with the terms of the act, and the proceeds applied to the payment of any liens on the machine, and to the costs of seizure and sale. Any balance remaining is to be paid into the Treasury of the United States.

It will be observed that under section 26 no qualification is made in favor of an owner whose car is being unlawfully used without his knowledge or consent, while, on the other hand, full provision is made for the payment of all outstanding liens against the machine.

On the question whether the section in question will be so construed as to protect an innocent owner whose car has been used in violation of the act, attention may be called to the fact that in several states in which this question has arisen under state prohibition laws, it has been held that the courts may not interpolate such a qualification into the law where none has been expressed by the legislature, while in other states a contrary ruling has been made. There seems to be no question, however, as to the constitutional validity of a law so construed.

By way of emphasis and to avoid misapprehension it should be specifically pointed out that under the section providing for the seizure of a machine used for the unlawful transportation of liquor, it is an absolute condition of the seizure that at the moment thereof the car be engaged in the unlawful traffic. In other words, a car which has been used for unlawful transportation is not thereafter subject to seizure for such misuse.

FROM the above discussion it is apparent that manufacturers and dealers have nothing to fear from the standpoint of the protection of their liens for unpaid purchase money on cars sold by them, at least as far as the unlawful transportation of liquor in automobiles is concerned. With reference to cars in which liquor is kept for sale or is manufactured, a more difficult question is presented, on account of the failure of the law to deal specifically with this point. But the problem here relates only to cases in which the owner of the car uses it illegally, or knows of and permits such use. There is no risk to either owner or unpaid seller where the car is illegally used without the knowledge or consent of the former.

THE validity of a chattel mortgage or conditional contract of sale covering an automobile is dependent upon the sufficiency of the description of the car in the instrument. In a very recent case, an automobile was described in a mortgage as "one Chalmers six-cylinder car." The court held that this description was not sufficient to make possible the identification of the car intended to be covered by the mortgage, and, that for this reason, the instrument, was not legally enforceable.

IN A decision just handed down by the Supreme Court of Kentucky, it is held that where a commercial truck is destroyed through the negligence of a railroad and it is impossible to immediately replace it, the owner is entitled, in addition to the value of his machine, to the reasonable rental value of another machine for the period during which he was deprived of the use of his car. It is to be observed that this ruling has no application to pleasure cars. As to these the courts do not usually permit an allowance for deprivation of use while a damaged car is being repaired or replaced.

Most personal accident policies contain a provision to the effect that the insurance company shall not be liable if the insured is killed or injured in an accident which is due "to voluntary exposure to danger." In a recent decision of the Supreme Court of Iowa, in which such a policy was the subject of the suit, the evidence showed that the insured had been killed in an automobile accident while driving his own car. There was evidence to the effect that the deceased had been driving negligently and recklessly. On this state of facts the insurance company contended that the case came within the above quoted limitation on its liability. The court decision, however, that in the absence of a specific finding that the death of the insured was directly due to his reckless driving, the point was not well taken and that the insurance company was liable under its policy.

IN A recent Alabama case it appears that a manufacturer shipped three automobiles to a dealer, bill of lading attached. Through an error of the bookkeeper the draft attached to the bill of lading covered the price of only two of the cars. The dealer, though seeing the mistake, obtained possession of the three cars by paying the amount of the bill of lading and sold them. The manufacturer brought suit against the purchaser of the third car, on the ground that through its mistake and the fraud of the dealer, the latter obtained no title to the car, and that, therefore, he could not give a good title to a purchaser. While holding that the dealer was liable for the price of the third car, the court held that the suit was not sustainable against the purchaser, who made his purchase in good faith and without any knowledge of the dealer's fraud.

A CASE emphasizing the legal obligation of motorists to take unusual precautions to avoid injuring children was recently decided in Louisiana. A small boy deliberately ran in front of an automobile, and continued ahead, zigzagging in front of the car, apparently attempting to race with it. The driver of the car did not slacken his speed, but tried to get out of the boy's path. A collision resulted and the boy was injured. While it was conceded that the car was not proceeding at an excessive rate of speed, the court decided that there was negligence in not taking special precautions to avoid the consequences of the boy's imprudence and that the motorist was liable for boy's injuries.

Federal "Delivery Type" Truck

IT IS apparent that the demand for light, fast motor trucks is increasing. Of the 1,050,000 motor trucks operating in the United States today, 682,500, or more than 65 per cent. are of one ton or under. Since last August, according to N. A. C. C. compilation, about 72 per cent. of the trucks built have been of this capacity. This increasing demand has caused many truck companies to bring out new models of this character during the last year.

The Federal Motor Truck Company is the latest to announce a new "delivery type" truck. It has been named the Federal Fast Express, Model R2, and is, according to its builders, capable of carrying any reasonable load up to the limit of its five-inch cord tire capacity, at a speed of at least 35 miles per hour.

THE Federal Fast Express has a chassis weight of 2950 pounds, body allowance 900 pounds, and with a one-ton load, a total road weight of 5850 pounds. Its wheel-base is 132 inches, tread 56 inches, loading space back of seat 110 inches.

The power plant is the Continental J-4 motor, the same motor as has been used for the past two years in the Federal Model SD. It has force feed lubrication and centrifugal

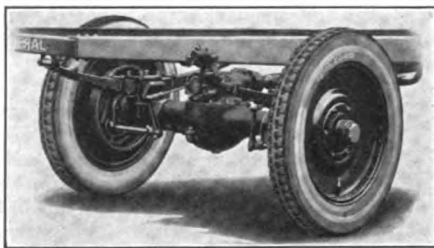
rotating parts are accurately balanced and ground to minute precision.

The final drive is Timken worm and worm wheel, the same as is used in all Federal models. There are at present said to be four makes in the light truck field using this type of drive.

In addition to the above two well known truck units, the Federal Fast Express has such items as Eisemann magneto, Zenith carburetor, Oakes fan, Long radiator core in heavy pressed steel shell, Borg & Beck clutch, Detroit Gear & Machine transmission, Peters universal joints, Gemmer steering gear, Stewart-Warner vacuum tank, Distel wheels, U. S. royal cord tires, Alemite chassis lubrication, Remy starter and generator and Exide heavy truck service battery. Other features are chrome vanadium springs, adjustable electric lights, mounted out of the way on dash, electric horn, pressed steel dash and toe boards.

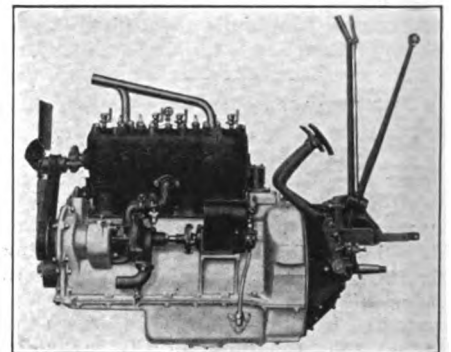
The dry disc clutch has large 10-inch facings; the brakes are 15

inches in diameter with 2½-inch facing; the magneto has variable spark control; the two propeller shafts are 1¾ inches in diameter; the pressed steel frame is five inches deep by 3½ inches wide by 3/16 inches thick; the chrome vanadium springs have seven leaves front and nine rear; the gear ratios are high 5.6 to one, second 9.4 to one, low 17.4 to one, and the reverse 21 to one.



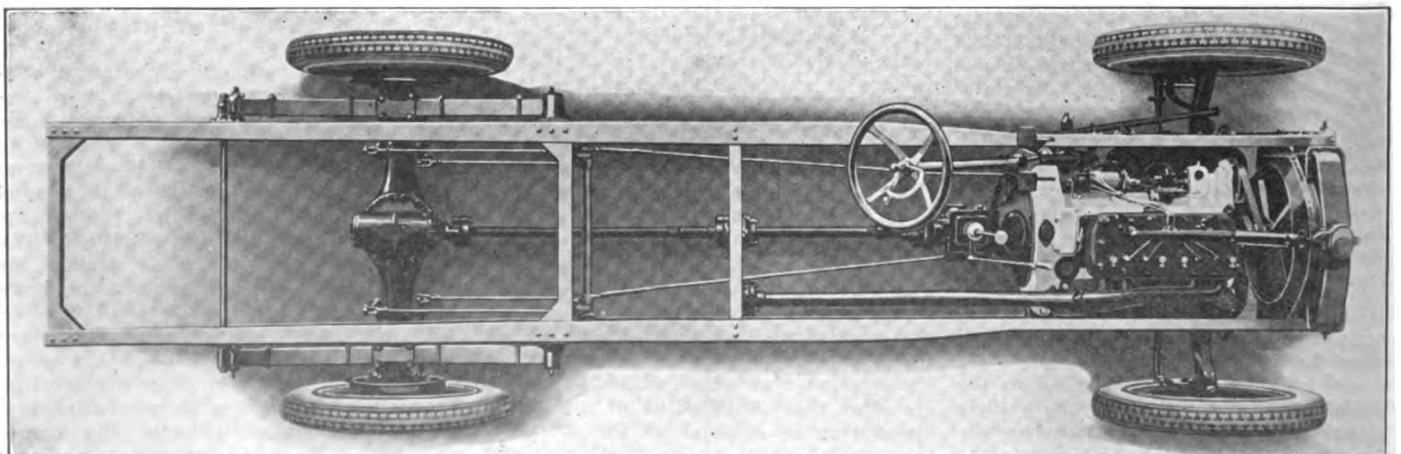
Rear End Assembly. Note Clean Lines.

water pump, with a bore of 3¾ inches and five-inch stroke. Its three-bearing crank shaft is heavy, being 2¼ inches in diameter, and its cam shaft, also three-bearing, is 1¼ inches. It is equipped with an adjustable heated exhaust manifold for summer and winter driving. Recip-



Powerful Motor and Well Made Units.

The use of a vacuum feed gasoline system permits the placing of the gas tank out of the way under the seat, yet giving positive fuel feed on all grades. The tool box and bat-



Clean Lines and Correct Balance Are Apparent to the Observer Who so Much as Glances at This New Federal Job and in Great Measure Account for the Hearty Reception Which Has Been Accorded It.

tery are also placed under the seat for convenience. The battery is constructed for the hard usage of motor truck work. In passenger cars the batteries have many rest periods, which enable them to renew themselves. In a motor truck which travels practically all the time the constant changing tends to buckle the plates unless they are of sufficient thickness to withstand the excess of current. Therefore the Federal Fast Express is equipped with this better and more expensive type.

The usual practise on some light trucks is to use carbon springs, but the Federal company found from long experimental work that there was not a sufficient factor of safety with the carbon steel, so chrome vanadium springs are standard equipment.

The Federal Fast Express is equipped with the Eiseman magnet.

Tires is another place where the manufacturer must be sure of his ground in delivery truck work. Federal uses five-inch Royal Cord, both front and rear.

In preparation for the demand for body equipment for the light job, the Federal company has made arrangements to furnish any style body.

HEIL DUMP BODY



Wholesale Order of Heil Bodies for Commercial Trucking Company of Detroit.

THIS photograph, taken on the premises of the Heil company, shows a recent installation of dual gravity bodies made by the Heil Company, Milwaukee, for the Commercial Trucking Company, Detroit.

The Commercial Trucking Company was very anxious to get its units in a hurry and as the contracts for road work were secured in Wisconsin the trucks were driven to Milwaukee for installing the units.

The trucks shown are Heil 1½-ton, 105-inch wheelbase Seldens, and each carry two one-yard Heil gravity bodies. The trucks are tractor units, so the bodies can be removed and the trucks used for hauling trailers in the winter.

The bodies are the standard Heil type which are giving such excellent

service wherever used. All seams are welded so that the bodies are water tight.

The Commercial Trucking Company, of which R. J. Handy is president, is now operating 25 Selden units. H. D. Fairchild is manager of the fleet that came to Milwaukee.

Eight of the trucks go to Brandon, Wis., and the other five to Waukesha, Wis., both working for the Badger Trucking Company. After the first six weeks the trucks will be assembled at Beaver Dam, Wis., where they will work on one job the rest of the season.

The party includes a number of families of the drivers and wherever they stop a camp is put up where they establish their headquarters. This arrangement seems to be much more satisfactory to all concerned.

MICHIGAN WILL AWARD FELLOWSHIPS

TWO of the following fellowships will be awarded not later than Sept. 1st and two not later than Nov. 1, 1922, by the Board of Regents of the University of Michigan.

The Roy D. Chapin Fellowship in Highway Transport, which is offered to provide for the investigation of an approved subject relative to highway transport.

The Roy D. Chapin Fellowship in Highway Engineering, which is offered to provide for the investigation of an approved subject relative to hard surfaced roads and pavements.

Two Detroit Edison Fellowships in Highway Engineering, which are offered to provide for the investigation of approved subjects relative to moderate cost country roads.

GENERAL Conditions: Each fellowship pays the sum of 250 with an allowance of \$50 for expenses. Holders of fellowships do not pay tuition fees.

A fellow must hold a bachelor's degree from a college of recognized standing.

He must enroll as a graduate student in highway engineering or highway transport and as a candidate for the degree of master of science or master of science in en-

gineering.

He must be in residence for one of the following periods: First semester, (October to February); winter period, (December to March); second semester, (February to June).

An application for a fellowship must include a concise statement of the candidate's educational training and engineering experience, and three references. Applications and requests for information pertaining

to the 25 advance courses in highway engineering and highway transport offered by the graduate school should be sent to Professor Arthur H. Blanchard, Engineering building, University of Michigan, Ann Arbor, Mich. Professor Blanchard, well known authority on highway engineering and kindred subjects, is said already to have received applications in a number that well establishes the interest which the announcement has created.

The Real Executive

(By C. F. HUHLEIN, Chairman Board of Directors of B. F. Avery & Sons, Louisville, Ky.)

ABOUT 10 years ago during a period of tight money, some bankers compiled a chart showing the comparative assets, liabilities, volume of business and ratio of profits of a dozen, or a score, of the larger implement manufacturers for a series of years. As a consequence some of us, not all, were reminded by our bankers that we were doing an increasing business with increasing indebtedness and were not showing a net profit commensurate with the volume of

business done. As a result those of us who were the "hit dog" did some housecleaning that resulted in debt reductions and a better conducted business.

Recent happenings in the realm of both foreign and domestic trade are impressing upon manufacturers the importance of a more constant study of the full effects of the slow and small turn-over, and the high costs of the slow turn-over, of capital in industry.

ICERTAINLY do not want to give our industry a bad name. It has earned and deserves the very excellent reputation it sustains everywhere. As a class taken altogether it is represented by thoroughly experienced, capable, hard-working, prudent men. The general run of companies in our industry are possessed of ample capital and resources and enjoy deservedly the highest credit and standing. No better or finer group in point of character, ability and financial strength can be found anywhere.

Executive management is aroused to the truth of the old adage that "new occasions teach new duties—time makes ancient good uncouth."

It all means that executive management should be a controlling management, cooperating, coordinating, adjusting, helping, but always controlling and directing and holding in proper check and balance the planning, production, sales and credit departments.

The Real Executive:

The real executive must see to it that the sales department sells enough goods, that the factory produces enough goods, that the credit and collection departments produce enough money, and that the controller harmonizes and coordinates all these activities in accord with a previously arranged budget and plan of campaign which should enable the corporation to get out of debt and stay out of debt, or nearly so for a reasonable time, once every year.

In planning ahead each year's campaign the executive should start with the interests of the stockholders in mind; have always before him a chart showing, for a series of years, the comparative capital owned by the company, the borrowed capital employed, with the variations or fluctuations of the borrowed capital and all other indebtedness within each year, never forgetting that the stockholders are entitled to reasonable and regular cash dividends and that the business should always be planned and operated with especial regard to conserving and improving the value and market ability of the stock certificates; further, that this can be safely and properly done only by operating a fair, sound and prudent business with due regard to the financial strength of the company; in other words, cutting the coat according to the cloth.

I think we all need to bear constantly

in mind that a man's (or a company's) life consisteth not altogether in the abundance of things which he hath and that the sooner we value our plants and all other fixed and non-convertible assets at one dollar, and calculate as profits only such net gains as are represented

AUTOMOBILE SHOWS OPEN JAN. 6 AT NEW YORK AND JAN 27 AT CHICAGO.

DATES for the two National Automobile Shows have been decided upon by the National Automobile Chamber of Commerce as follows:

New York, Jan. 6-13, at Grand Central Palace.

Chicago, Jan. 27-Feb. 3, at the Coliseum and the First Regiment Armory.

by liquid and quick convertible assets, the nearer we will be to getting on a correct basis for the sound conduct of our respective concerns.

We must have thorough and exact knowledge of all current production and selling costs at all times. We must operate in production and sales departments within our financial ability. We must at all times calculate and know the cost of handling, rehandling and turning over and realizing upon the product and the capital of the concern.

Trend of the Industry:

Our industry is a great staple industry. During the war the government classed ours as an essential industry; we owe our country, our customers and the world good service, and we are giving them better implements, better service and greater value for their money year after year. We owe to our employees and associates in business, including our stockholders, a fair, reasonable and liberal return on their investment of labor, talent, time and capital employed under our management.

Few of us will deny that the profits to the manufacturer have been below his deserts. Volume of business has been increased by strenuous efforts, great strain upon resources in men as well as in capital.

What we need is sound business statesmanship.

The first and finest element of statesmanship is the prompt recognition of the hard facts.

The number of concerns engaged in farm implement manufacturing is steadily declining; in 1870 there were 2076 concerns engaged in this business.

The value of the products is of course governed by the cost of raw materials and labor. The tonnage and number of implements produced, excluding such exceptional periods as 1914-'15 and 1920-'21 is no doubt gradually increasing.

The New Day:

This is an extraordinary period in which we find ourselves, and it will repay us to pause and reflect.

We read that at a farmers' picnic held in Madison county, Nebraska, attended by over 22,000 people, 4304 automobiles and one lone team of horses were counted. While no explanation is given as to how the team of horses happened to be present, it is just possible that the owner had his car in the shop for repairs.

There are reported to be about 10,500,000 automobiles and motor trucks now in use in this country and it is stated that fully one-half, or perhaps nearly all, of our entire population could be seated in these vehicles at one time and thus "jump in the wagon and all take a ride" together.

In 1920 there were on the 6,500,000 farms of the United States, 246,000 tractors, 139,000 motor trucks and 2,146,000 passenger automobiles.

It is estimated that the people of the United States, city and country, are spending \$2,500,000,000 for automobiles, motor trucks and tractors and nearly or about half of this sum additional for upkeep of same, annually.

The average annual expenditure for agricultural implements in this country is estimated at about \$500,000,000.

These items are impressive and prove to us that things have changed and are progressing rapidly in the farming world. As executives, we must have a grasp and a vision of a new agricultural world as

The Highways, the Motor Vehicle and Progress

(By GEORGE M. GRAHAM, Highways Committee, National Automobile Chamber of Commerce.)

THOSE who think of the automobile merely as a "pleasure car" have perhaps never contemplated what a terrific real estate upheaval there would be if the passenger-carrying automobile and the freight-carrying truck should suddenly be withdrawn.

The evil consequences resulting would affect both city and rural population.

Within the last 20 years farmers have found it possible to go beyond unproductive or unprofitable land, purchased originally merely because it was contiguous to steam railways.

They have penetrated further and further into remote rural sections, because in the motor truck they have a connecting link between the point of food production and the point of marketing.

Records of the Department of Agriculture show that in many cases the farmers' haul to market has increased from 6.9 miles to 17.6 miles, an expansion based entirely on motor truck haulage.

IF THE motor truck should be eliminated, what would happen to farm land values can readily be imagined.

Similar would be the baneful effect on city dwellers.

The city man no longer lives in the city.

He has gone far into the suburbs.

He finds it necessary so to do in order to escape the offensive, and in many cases unsanitary, contact with factories.

It will be found by analysis of conditions in any great city that its central portion is more and more given over to commerce and manufacturing, and that the residence section constantly moves further into the suburbs.

The man of wealth, the man of only reasonable means, finds that the automobile gives him ready touch with the heart of the city.

He ever has at hand a medium of individual transportation.

In this one point alone is the assurance of the permanency of the automobile business.

The man with \$50,000, in his suburban home, or for that matter, the man with only \$5000, is not going to jeopardize that investment for the price of an automobile.

Therefore, the automobile and the motor truck actually constitute a kind of real estate insurance.

I have used the term "individual transportation." I should like to analyze that term to some extent, and undertake to show you a most interesting reversion of method.

Generally speaking the impulse of

our life has been to progress from individualism to centralization.

Our country began as an association of individual states, but their boundary lines seem constantly to become less important and the Federal idea more dominant.

Return to Individual Transportation.

The experience of the work man and manufacturing processes affords another example.

TO PROTECT TRAVELERS FROM SMALL TOWN AUTHORITIES.

AT A CONVENTION to be held at Minneapolis, Minn., on Aug. 25 and 26, a national programme to protect the tourist and automobile traveler from prosecution at the hands of the many over-zealous small town authorities, who arrest the motorist for many petty offenses, will be discussed, it is stated.

These plans should prove intensely interesting to all the delegates, as well as the plans to standardize free camp sites on a national scale which is to be placed before the delegates, it is said.

Formerly the workman's productivity depended upon and was represented by his possession of the tools of his craft. The carpenter with his saw, the shoemaker with his awl, the blacksmith with his hammer, the printer with his stick,

carried his trade with him wherever he went. That was individualism.

Then came a great modern development.

Huge machines supplanted the tool. They enormously increased the ratio of production.

With that development came a train of great sociological problems, the complete solution of which we have not yet found.

You illustrate the tendency of centralization in your own home every day.

You don't go down to the pump or to the well for water. You don't light the kerosene lamp. In many cases you don't even produce your own heat.

All these come from central power plants. This is centralization.

At one period, for centuries, in fact, individualism dominated transportation.

The man with a horse and wagon, the man with a boat, both are instances.

Then great steamships, steam railways and electric trolleys took the transportation mediums from the individual.

This was combination, improved public service, and these great mediums will always be with us in a place of commanding importance.

But transportation has also seen a return to the individual facilities, a most unusual development.

In both freight haulage and passenger transportation the motor vehicle has turned back the hands on the face of the clock of time, and we

(Continued on Page 448.)

Brings Store to Customer

A COMPARATIVELY new system of selling has recently been launched at Columbus, O., by the Modern System Grocery Company. The plan is to take the store to the customer, instead of the more common method of the customer coming to the store. The company already has 10 of these rolling stores in operation in Columbus.

A description of the body used in the rolling store will prove of interest to our readers, also a gen-

eral description of the manner of conducting business.

The body is eight feet wide, 20 feet long and six feet high, mounted on an Acme model 60 chassis, with a 12-inch monitor top, which lets in the light and ventilation. The body is painted white, then enameled.

Entrance to the store is at the rear and as customer enters he picks out the merchandise desired, all of the stock being package goods, therefore, requiring no wrapping.



Both the Interior and Exterior of This Rolling Store Present a Pleasing Appearance to All Prospective Customers. Business Is Conducted on the Cash and Carry Plan and the Service Is Highly Appreciated by Patrons.

THE customer moves up toward the front of the truck where the driver is seated, a cash register by his side. After paying for the goods selected the customer leaves the store by a front doorway used exclusively as an exit. As will be noted by the illustrations accompanying this article the merchandise is attractively displayed. A very complete stock is carried, including butter, eggs, vegetables of various kinds, canned milk and the regular staples. Just to illustrate the completeness of the stock there are six different nationally advertised brands of baking powder in stock.

The truck is equipped with an efficient refrigerator system for those commodities requiring refrigeration. Smoked meats of many different kinds are carried by the store, but no fresh meat. The driver is an experienced grocery clerk and handles the entire job alone.

The value of the stock carried varies from \$800 to \$1000. Daily sales will amount to from \$100 to \$150, so

the stock will turn itself once in about every 10 days.

Each store operates daily the year around over a carefully planned

SOUTH PASADENA CITIZENS WANT BUSES.

THE returns on a questionnaire sent out to 1000 citizens of South Pasadena, Cal., indicated a six to one majority in favor of the establishment of a motor bus line between Pasadena and Los Angeles, and that more than half the population of Los Angeles, 312,000 out of 575,480 residents, use the new Union Motor Bus Depot regularly, the ticket sales amounting to \$700,000 for nine months.

route and follows quite closely a time table, so as to be in a given point at the same time each day. At the present time the stores are operating in the city only, each covering

a route from four to 12 miles in length.

A warehouse is maintained by the company, where the trucks are driven at the end of the day's trip. Stocks are replenished at night and trucks made ready for the next day. A supply truck is maintained and its routing is so maintained that each one of the rolling stores is visited by the supply truck and such stocks as are found to be getting low are replenished. The supply truck's visit to the rolling stores is planned so as to meet it either just before or just after the store reaches the point on its route where the greatest volume of sales is usually made, thereby insuring a complete stock at all points of the route.

The store does not return to the warehouse after it leaves in the morning until the day's work is completed. The driver secures his noon day meal at some point on his route or brings his lunch from home.

The overhead cost of the rolling store is considerably less than it is

with the average permanent local store, the former requiring but one clerk and he will actually sell as much as two to four clerks in the ordinary store can; the selling is more evenly divided or distributed throughout the day in the traveling store, for once the customers learn that at a certain time each day their store will be at their corner, they soon adjust their buying to the schedule of the traveling store. All of these facts make for slightly lower prices in the traveling store, although to judge from the reception given these stores there is no need of a price inducement to attract customers to the traveling store, as the public seems to appreciate the advantage of having the store come to their door at a given time each day, the neat, orderly way the stock is displayed and the convenience and system found in every detail of the traveling store movement.

Judging from the experience of rolling stores at other points, the venture will be a decided financial success. It is expected that a truck will pay for itself in approximately one year. The first day that the first truck was out it commenced to do a satisfactory business in a locality which had not been previously advised of the coming of the truck. It is naturally expected that it takes a week or so to work up a route, but the experience of the first truck does not demonstrate that it would require any length of time.

To J. W. Baker, who has been actively connected with Acme in both the capacity of a special representative and dealer, is due a very large share of the credit for the establishment of these rolling stores in Columbus.

There are thousands of other communities in the United States in which just such a venture as this would prove an unqualified success, according to interested authorities who have carefully examined all details of the plan.

A. W. Reader, formerly connected with engineering standards for the Willys-Overland Company, Toledo, is now associated with the Chevrolet Motor Company, Detroit.

MILLION COWS IN ICE CREAM BUSINESS.

THE urchin who eats an ice cream cone, and all others who consume this frosted sweet, are doing a larger share than is generally known in restoring prosperity and happiness to the farm, according to Guy H. Hall, director of the National Institute of Progressive Farming.

"When I was a boy," said Mr. Hall, "ice cream was a holiday treat. Now it seems to be an every-day commodity. In collecting data on the dairy situation, I learned recently that 1,000,000 of the 23,000,000 producing dairy cows in this country are, so to speak, in the ice cream business. Perhaps the dry law has something to do with it, but in any event this increased farm revenue is even now reflected in increased sales of farm lighting plants, tractors, power driven implements, automobiles and the like, which are doing so much toward making farm life more agreeable and prosperous. And the sweet tooth of the public is doing its bit in this direction."

RURAL MAIL CARRIERS USE AUTOMOBILE.

The efficiency of the automobile as a means of delivering United States mail in the rural districts of the country is every day being demonstrated more and more, according to E. T. Strong, sales manager of the Buick Motor Company of Flint, Mich.

Government statistics show, states Mr. Strong, that the old time rural mail carrier with horse and buggy is fast disappearing. This, it has been found, is due to two things.

First, statistics show that the volume of mail is increasing to such an extent and the route of the various carriers is becoming so lengthened and complicated with parcel post packages and other heavy mail that it is becoming more and more difficult for the carrier to make his daily run in anywhere near the time he used to take.

Second, reports show that in the so-called rural districts the gross pay of the average mail carrier who uses an automobile is \$2570 per year, while the pay

of the man who uses the horse and buggy is but \$1830.

These men, it is said, are coming to realize more and more that the automobile is to be the most important factor in transportation in their business and that they can increase their earning capacity by more than 33 per cent. by its use.

BUSES GIVE GOOD SERVICE IN WASHINGTON.

WASHINGTON, Aug. 20.—Residents of Washington, D. C., are again congratulating themselves on their ability to command motor bus transportation. A heavy rain paralyzed street car service for the better part of a day, recently, but the famous Hinkley-engined buses of the Washington Rapid Transit Company kept plying on schedule, and moved the crowds, thus repeating their feat during the famous snow storm of last winter, when the buses never missed a trip, though virtually the only moving vehicles in the city.

The rapid growth and sensational success of the Washington buses has made national fame for the fleet. This fact, as Sales Manager Charles A. Neville of Hinkley Motors, Incorporated, points out, reflects corresponding credit on the automotive industry of Michigan, the engines having been manufactured at Ecorse, and the completed buses shipped from Lansing.

ROUSES SPECIALIZED TRUCK MAKERS.

Plans are being made to investigate the reasons of discrimination by the City of New York against trucks in which specialized units are used. Motor truck companies manufacturing this type of machine have decided to take this step following the action of the street cleaning department in advertising for bids on trucks in which it was specified that the engine must be built by the same company that manufactures the truck. This limits the field to bidders to approximately half a dozen companies.

It is the intention of the manufacturers to point out to the city that many of the specialized companies have been long in the truck business and that their products have been used and are at present used in the largest cities with results equally as good as those received from trucks which are units of their own make. It will also be asserted that this discrimination is unfair to the representatives of the companies having properties in New York City.

BALTIMORE GIVES FINE RECEPTION



THE Baltimore Transit Company has just opened two new bus lines over its Charles Street and Druid Hill Park routes. Sixteen Republic Knight-Motored buses of the single deck type have begun operation over the Charles Street route, and 10 have been assigned to the Druid Hill Park route, with termini at Camden station and Eutaw place. The buses will operate on a six-minute schedule except during rush hours, when a five-minute headway will be maintained. According to officials of the transit company the choice of bus equipment for these two important lines is the outgrowth of tests which were begun in October, 1921. At that time a single Republic Bus of the type now in use was placed in operation on Charles Street, and for 7½ months, until June 1 of this year, every detail of its performance was carefully observed by officials of the company. During the test period the bus under observation traveled more than 35,000 miles and carried 157,143 passengers. The grand average of fuel consumption was nine miles per gallon, and the cost of repairs, including labor and material, was less than \$100, a low figure indeed for operation of this nature.

Street Flusher Saves Western Towns

THE International Motor Truck has scored another point in its all-around service to the nation. This time it went out of its ordinary calling, that of a street-flushing unit, and balked the grimest of destructive forces, fire. In truth, without the aid of this truck two thriving Utah towns might now be nothing but charred wastes.

The City of Tremonton, Utah, which is owner of the International motor truck named above (model 101, equipped with street flusher and auxiliary engine), suddenly in early morning, July 10, faced what might easily have brought about its complete destruction. With inadequate water pressure a single hose reel and numerous frame buildings, things were set for a city-wide conflagration. And city-wide it would have been, had not the International street flushing unit just recently purchased been rushed to the scene.

The auxiliary engine of Tremonton's new flusher is equipped so that water under pressure can be pumped from a low-pressure main or any other water supply. In the case of Tremonton's fire the water intake was attached to a city hydrant and the city's fire hose to the pump.

Tremonton's water supply is pumped into mains by a stationary gasoline engine, but the pressure was entirely inadequate for such a fire. The International truck was quickly rushed on the job, its auxil-

iary engine put into play and at once a pressure obtained that soon put the fire under control. For 2½ hours the auxiliary engine faithfully plugged away and provided ample pressure. Now citizens of Tremonton are full of praise for its new street flusher, suddenly turned fire fighter. Everybody declared that it saved the town.

The following is from Tremonton's mayor:

"It is with a degree of civic pride that I can refer to the efficient work of our new sprinkler and fire equipment recently purchased from the International Harvester Company by the City of Tremonton.

"At 2:30 a. m. on the 10th instant a fire broke out in a 10-room two-story house and the fire by all appearances threatened to destroy this and adjacent buildings, but in

less than 45 minutes the firemen had extinguished the flames to the great surprise of about 200 spectators, who would have witnessed a very destructive fire had it not been for this equipment and the city water main supply that quickly controlled the flames."

By coincidence this same International street flusher emergency fire fighter, the very next day at 3 a. m., had a chance to prove its worth in Garland, Utah, seven miles distant from Tremonton. If anything the threat to the city of Garland was worse than that at Tremonton. Here an entire business block was ablaze and burning shingles and coals shot high in the air. Insufficient water pressure made it a hopeless task of fighting the fire, so a plea for help was sent to Tremonton and the International again proved its worth.



The Internal Combustion Engine Always Has a New Trick Up Its Sleeve. Here's an International Truck That Saved Two Towns from Destruction by Fire.

TO HUGE FLEET OF REPUBLIC BUSES



OFFICIALS of the Baltimore Transit Company state that the result of the test installation afforded ample proof that all essentials of successful passenger transportation are incorporated in the Republic Knight-Motored Bus. First among the essentials demanded by the company were those factors which make for perfect safety and comfort of passengers, and second, economy of operation and adequate insurance against interrupted performance. Special emphasis on silent operation has brought the Knight Sleeve Valve motor rapidly to the front for passenger transportation service. Not only does it add to the comfort of the riding public, but provides for silent running so desirable in residential sections through which bus routes pass. Each of the new buses has a seating capacity of 24 passengers. The seating arrangement has been carefully worked out to provide the maximum of comfort, as well as convenience in entering and leaving the bus. The driver has excellent vision in all directions, due to the use of a specially designed windshield, and semi-circular windows in the front vestibule. At night the buses will be illuminated inside by means of eight dome lights.

Armed Trucks War on Booze Runners

The war against liquor smugglers in Northern New York is on in earnest, according to a recent report from that section of the country. The new patrol along the border is now a reality. This fact was impressed on local residents yesterday when two light army trucks with machine guns mounted on their platforms reached this city. The trucks are the forerunners of a fleet which numbers 24 in all which is on the way to this section from New York City.

In connection with the use of the trucks there will be about 30 Federal agents located in and about Ogdensburg. They will work with the

United States customs agents. Besides the trucks, boats will be used to cover ports on the river. One fast motor boat will operate out of Clayton. Trucks and men will be located at Ogdensburg, Malone, Mooers, Rouses Point and other places.

The trucks, which are of the one-ton type, are deceptive in appearance, as there have been transplanted on their chassis the engines usually mounted in five-ton trucks. The cars are capable of developing 70 miles an hour. Each truck is manned by two men who carry side arms and are expert in the use of their mounted guns. The guns are

encased and are of a light field type which will enable their being quickly dismounted and transported by hand.

The trucks will not be stationed at any one place, but will be rovers, doing duty between this city and Rouses' Point. The trucks are able to speed up to 60 miles an hour within the space of less than 400 yards.

The cars are being sent out by the Treasury Department to work in conjunction with the customs officials and the state troopers. The movements of the entire fleet have been kept very much in the dark and their being detailed to Ogdensburg came as a surprise.

Is Krupp Counterfeiting Trucks?

It is stated that the truck makers of this country have received information to the effect that American trucks are being counterfeited in the Krupp factories in readiness to be shipped back to this country as trucks which were made over here. Because of the exchange conditions and that of Germany, it is said these trucks can be made up at a price that will allow a good margin of profit even if sold at the auction prices now prevailing on these supposedly war trucks.

The presence of large stocks of war trucks brought back from Europe by speculating companies is holding up the development of the

truck business in the United States. It is stated that purchases have been made by large fleet owners at prices which eliminate any competition.

An endeavor is being made to induce regular dealers in trucks to dispose of these holdings to the trade at whatever profit they can realize. The dealer trade of the entire country is being canvassed by mail in an endeavor to line up a selling organization, it is believed when this is consummated that the bringing in of trucks will be undertaken on a much more extensive scale.

Five-ton models of two well known manufacturers were offered

at a price reduction of \$1340 and \$1580 respectively. These are prices which are practically on a par with that charged for one-ton models. The serious effect of this reduction is that it discourages the dealers and discourages new truck business.

Truck makers are looking to the authorities at Washington for relief in the situation by the passage of the Graham anti-dumping bill, which would impose a 90 per cent. duty on these reshipped vehicles. The harm already done is said to be comparatively slight to what it will be if the bars are allowed to remain down. The industry has suffered quite enough from war trucks.

FWD Tractor-Truck

WITH the advent of the tractor truck, another problem in the motorization of city fire departments was removed from the minds of city fathers.

The most recent tractor truck to

enter the fire department field is the FWD, manufactured by the Four Wheel Drive Auto Company of Clintonville, Wis. This tractor has a 105-inch wheelbase, four-cylinder Wisconsin motor which develops a

horsepower of about 65 and is capable of driving the tractor and load at a speed of approximately 25 miles per hour.

Two of these tractors have been purchased and were recently used by the City of Newark, N. J., in the motorization of two of their hook and ladder trucks. In making this change the front wheels and axles of the horse drawn hook and ladder trucks were removed and the front end of the bodies mounted on the tractors by means of a fifth wheel.

This method of converting horse drawn equipment requires very little work and when complete makes a very practical unit.

In appearance, such a unit does credit to the fire department of the city in which it operates and greatly increases the efficiency.



This FWD Tractor-Truck Adds Greatly to the Efficiency of the Modern Fire Department. Its Outstanding Feature Is Dependability.

THREATENS CEMENT INDUSTRY

THE effect of the coal shortage on industrial operations, already noticeable in reports from New York stating that some of the large steel mills will probably have to shut down unless the coal strike is settled within the next few weeks, is also being felt by the cement industry and the difficulty of obtaining coal has caused a number of plants to cease operations for the time being. A statement issued by the Portland Cement Association in Chicago points out that the cement industry is the fourth largest consumer of coal in the country, over 7,000,000 tons being consumed at cement mills every year. Many of the mills have been having difficulty in securing coal for some time. With the regular source of supply shut off by the strike the mills have been forced to secure coal from more distant mines, at higher prices and a longer haul. As many of these sources are now cut off the situation has become acute and unless the strike adjusts itself in a few weeks more of the plants will be closed, or operated on part time.

Coming at a time when the country is experiencing one of the greatest building booms in its history, a shortage of cement would have a serious effect on every class of construction operation. As cement enters into practically every building that is erected the cutting off of the cement supply through the coal strike would tie up many of the building projects. A similar effect would be felt by the road construction industry, as cement is used in a large majority of highway programmes.

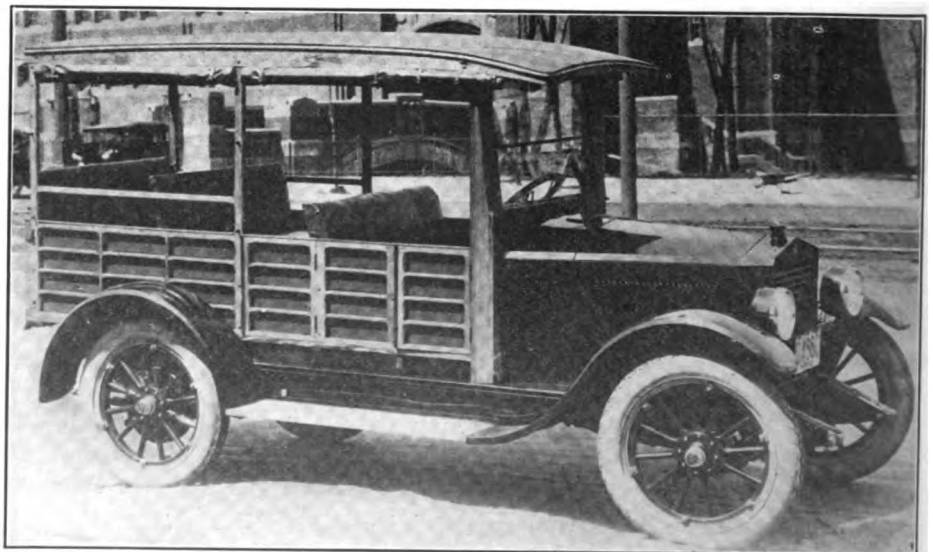
In addition to the coal strike, the railroad strike has a direct effect on the ce-

ment supply. The equivalent of 377,000 box cars of 50-ton capacity each were required to haul last year's cement output to the consumer, and if the strike ties up transportation it will be impossible to get the cement shipped to the points where it is needed. Incidentally, the textile strike, if it ties up the production of the textile mills, would have a serious effect on cement industry, as 30,000,000 cloth sacks are needed every year by the cement mills. These sacks require

an immense amount of cloth—a strip 30 inches wide and over 17,000 miles long—and if the mills were unable to supply new cloth for sacks it would be a difficult matter to handle the cement orders.

P. H. Bartlett, formerly motor vehicle machine shop superintendent for the Sinclair Refining Company, Chicago, has been made superintendent in charge of motor truck maintenance for the Edward Lasham Company, also of Chicago.

A "COTTON" BODY



A Town and Country Body Mounted on the Essex Chassis. Many of These High Grade Jobs Are Being Used at Summer Resorts.

THE CONTINENTAL LIGHT SIX

A NEW field has been entered by the Continental Motors Corporation in the bringing out of a new light six motor. For the first time in the history of this company's 20 years of specialization in the design and manufacture of gasoline motors for automotive purposes, a six-cylinder Red Seal motor is available for cars weighing in the neighborhood of 2400 pounds. Heretofore the six-cylinder models built by this company and carrying the Red Seal trademark, have been for passenger cars of a heavier type.

The model 6Y embodies the same proven practises which have characterized Continental construction for many years. It adopts itself splendidly to the elaborate manufacturing equipment devoted to Red Seal motors. Production reports from the factory indicate that already the demand is taxing to the limit the manufacturing facilities set aside for this new model.

THE model 6Y is designed along the same general lines as the model 8R. It embodies the same principles and possesses the same features that have contributed to the popularity of its larger prototype, the 8R.

The bore of $3\frac{1}{4}$ inches and stroke of $4\frac{1}{4}$ inches give it 195.6 cubic inch piston displacement, and a N. A. C. C. rating of 23.4 horsepower.

The maximum developed horsepower is 50 at 2600 revolutions per minute. With a minimum of 115 and maximum of 118 foot pounds torque from 400 to 2200 revolutions per minute, a reserve of stamina and performance should be available at all operating speeds. Forty-five horsepower is developed at 2150 revolutions per minute. From this it is evident that the model 6Y was designed to function best at medium speeds and to possess the surplus horsepower and torque so essential to smooth and flexible performance. Yet it is understood that in a stock car the motor has shown a speed of over one mile a minute.

Typically Continental the model 6Y is noticeably free from superfluous parts. The motor is "L" head type with the cylinders cast in a unit with the crank case.

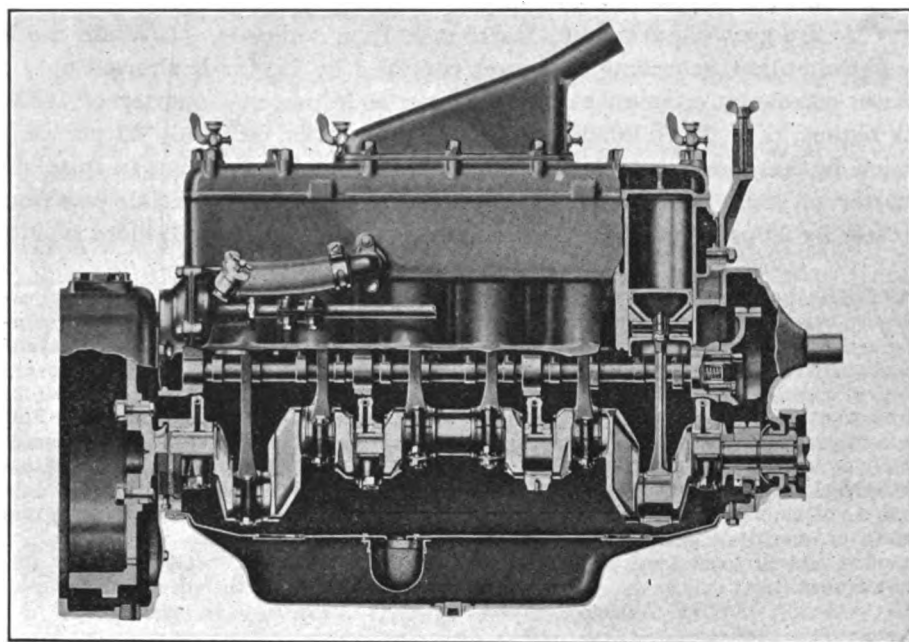
The six cylinders are cast in one block. Water jackets are designed, not merely for cooling purposes, but particularly to maintain a uniform and ideal operating temperature. Cooling water completely surrounds each cylinder, valve seat and valve stem. To insure even wear at all points, uniformity of expansion was made a dominating factor when planning the cylinder assembly. The cylinder head, water jackets, cylinder walls and reinforcements have been laid out in such a manner as to insure maximum accuracy in the foundry toward flawless and even castings.

The removable cylinder head is held firmly and evenly against the copper asbestos jacket by 21 studs. Four lifting lugs simplify removal of the head. Spark plugs are located in a position where they receive the maximum benefit of the incoming gas.

The well known Continental practise is used in the model 6Y motor, wherein the crankcase is designed along the lines of a bridge truss. Reinforced webs extend to the four bearings.

With this construction the crankshaft is held positively in alignment, thus contributing toward smooth operation.

Lubrication is provided for by a pressure feed system with which a gear type oil pump is used. The pump is located



Manufactured by the Famous Continental Motor Corporation This New Light Six Is Sure of a Hearty Reception by Manufacturers of Specialized Cars.

in the chain case. The oil is drawn through a copper tube leading from the oil reservoir to the pump. From the pump it is forced to the main distributing line from which branches run to each of the four main bearings. Other parts are lubricated by the oil which is thrown from the connecting rod lower end bearings. As an added protection to each of the four camshaft bearings a catch basin is provided, from which oil is fed through drilled ducts to each of the bearings.

The capacity of the centrifugal water pump is carefully balanced with the cooling requirements of the motor and capacity of the water jackets. Pump is bolted to flywheel housing and is driven by an extension shaft from the electric generator.

The intake and exhaust manifolds are separate castings, but arranged so the heat of the exhaust is utilized to assist in the vaporization of the inlet gas. This feature contributes toward maximum motor efficiency and minimum fuel consumption.

The design, as well as the construction of the reciprocating parts, is indicative of the extent to which the Continental engineers appreciate the function and importance of their use. Not only are the six sets in each engine accurately balanced with one another, but each

individual set is balanced within itself. While the value of light weight is appreciated, still the line has carefully been drawn, where light weight must stop and give preference to those qualities which insure strength and long life.

There is no needless weight on account of providing machining bosses, nor is there a lathe center in the head of the piston to form the anchor post for the first accumulation of carbon. The final finish given the piston as the result of the grinding operation is such that after the piston is worked in well with the cylinder a hard mirror-like surface is developed. This type of surface resists wear and permits the parts to function perfectly.

The piston length, which is $3\frac{3}{4}$ inches, has been carefully determined to coordinate with the angle of the connecting rod movement and, at the same time, to afford long life with quiet operation. Three piston rings, simple one-piece type, diagonally split, are hand fitted, first to the cylinder bore and then to the grooves of the piston. The expansions of the several rings, due to the varying temperatures to which they are subjected, are taken into consideration at the time of hand-fitting.

The piston pin is clamped in the connecting rod. The clamp bolt passes

Here's a Problem

The Reserve Stock of Gasoline Is the Largest in the History of the Country Yet the Price Has Advanced—Is the Touring Season the Answer?

GASOLINE reserve stocks in the United States are the largest in the history of the country, and are growing at a much faster ratio than domestic consumption, according to figures compiled by H. J. Lowe, petroleum economist of the Bureau of Mines, at the request of A. A. A. officials. The present stocks, on which figures were compiled at the end of the first quarter of 1922, were 854,232,000 gallons, which was greater by 20 per cent. than for the first quarter of 1921

and 36 per cent. greater than for the first quarter of 1920.

While the consumption of gasoline has increased, it showed only seven per cent. more used in the first quarter of 1922 than for the first quarter of 1921, and only 25 per cent. more than the first quarter of 1920. Thus in spite of the increasing number of cars, A. A. A. officials point out, the stocks of gasoline are increasing still more rapidly.

WITH these figures at hand, it has been hard to understand the reason for the rise in the price of gasoline, which has increased from four to five cents a gallon during the first three months of the year. Knowing that each increase of one cent in the price of gasoline means an additional bill of \$50,000,000 for the motorists of America, A. A. A. officials have been working diligently to obtain an official investigation which would at least give a reason for the advance.

So far the first tangible result of these efforts has been the issuance of a questionnaire by the Senate Manufacturers' Committee which has been sent to every oil company and which is designed to show where the increase originated. This committee, which is headed by Senator LaFollette of Wisconsin, hopes to obtain from the answers received sufficient data to form a basis for further investigation of this question.

"I cannot see a just reason for this year's advance in the price of gasoline,"

said George C. Diehl, president of the A. A. A. "If the stocks were diminishing, instead of increasing, there might be some reasonable basis for the advance, but with stocks growing faster than consumption, prices should come down instead of advancing. I hope every motorist in the United States will make it his business to write his congressman and senator, urging their cooperation in making any investigation of this question a success." Don't delay following this advice. It may save you money.

Retail Gasoline Prices—July 1921, to July 1922, Inclusive

	1921						1922						
	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	March	April	May	June	July
Boston	26	27	27	27	28	30	30	29	26	26	27	28	28
Philadelphia	26	25	24	24	27	28	28	26	26	26	28	29	29
Newark	24	24	24	23	26	27	27	26	25	25	27	28	28
Baltimore	23.5	23.5	23	22	25	26	25	24	24	24	26	27	28
Charleston	25	25	25	23	26	27	26	25	25	23	26	27	28
Chicago	20	20	19	19	20	21.5	21.5	21.5	21.5	21.5	23	24	24
Detroit	20.9	18.9	18.9	18.9	20	22.4	22.2	22.2	22.2	23.2	24.2	25.4	26.4
Milwaukee	20.3	20.3	20.3	20.3	20.3	23.2	23.2	21.9	21	22.9	23.9	24.7	25.7
Des Moines	20.6	20.6	20.6	20.6	20.6	22.2	22.2	22.1	22.1	23.4	24.4	25.4	26.4
Indianapolis	20.6	18.4	18.6	18.6	20	22.1	22.1	21.8	21.8	22.8	23.8	24.8	25.8
Kansas City, Mo.	17.7	17.7	16.7	16.7	16.7	19.2	19.2	19.2	20.2	22.1	22.2	23.5	24.5
St. Louis	19.7	19.7	19.7	19.7	19.7	21.2	21.2	21.2	22.2	22.2	23.2	24.5	25.5
Cleveland	21.5	21	21	21	22	23	23	23	23	23	24	25	25
Cincinnati	21.5	21	21	21	22	23	23	23	23	23	24	25	25
Youngstown	21.5	21	21	21	22	23	23	23	23	23	24	25	25
Little Rock	21.5	21.5	19	20	20	25	23	22	22	22	20	25	26
Galveston	18	15	18	20	21	23	23	22	22	22	21	25	25
Dallas	18	18	14	20	21	21	18	18	21	22	21	25	25
New Orleans	20.5	19.5	18.5	18.5	20.5	24.5	24.5	22.5	22.5	22.5	24.5	27.5	27.5
Louisville	20	19	19	19	21	23	24	23	23	23	24	26	26
Atlanta	21	20	23	22	24	27	26	25	25	25	27	29	29
Jacksonville	20	19	21	22.5	22	25	24	23	23	23	23	25	26
Denver	23	23	23	23	23	24.5	23	23	23	23	25	27	28
Salt Lake	29	26	26	26	26	26.5	26.5	26.5	26.5	26.5	28.5	30	31
Cheyenne	23	23	23	23	..	..	23	23	23	23	24	26	26
Seattle	26	26	24	24	25	25	25	25	25	25	25	25	25
Spokane	30	30	28	30	29	29	29	29	29	29	29	29	29
Los Angeles	25	23	23	23	23	23	23	23	23	23	23	23	23

This Table Furnished by N. A. D. A. Illustrates the Facts as Set Forth in the Foregoing Text. An Increase in the Price of Gasoline of One Cent a Gallon Means \$50,000,000 Added to the Bill of the American Motorist.

The Railway Safety Problem*

SEVENTY per cent. of the accidents resulting in personal injuries still are due to the carelessness of the injured person, or could have been avoided by greater caution on his part. It is well, therefore, that the Chicago Safety Council emphasizes the individual. It is consequently always ready heartily to cooperate with any and all constructive efforts to educate the public and employees along lines of safety. The slogan "The Conservation of Human Life" is expressive and true. The prevention of financial and economic loss, incident to avoidable accidents, is an

important by-product, but the great benefit is the saving of life and limb.

I congratulate the council upon this significant gathering and the large number of men it was able to bring together for the intensive study of accident prevention.

I congratulate the members of this graduating class for their determination to complete this safety course and be awarded the diplomas which stand for that interest in one's work, which always precedes certain advancement.

WITHOUT the active support of the supervisors in direct charge of men, any campaign would be ineffective. With their undivided support it cannot fail.

Undoubtedly the grade crossing accident presents one of the most difficult problems in railroad safety work. The public cannot be reached effectively by any individual railroad.

The people who carelessly cross the tracks of the Great Western today will cross those of other railroads tomorrow, or drive recklessly through the streets of your city the day after.

In 1921 there were more than 10,000,000 automobiles in the United States. Eight autos are struck by trains every day in the year. Twenty per cent. of automobile accidents are not due to the train striking the automobile, but on account of the automobile running into the side of the train. Eight out of every 10 people drive over railroad crossings without looking either way for the approach of a train.

In 1920, 6958 persons killed and 168,309 injured were involved in railroad accidents. Two hundred and twenty-nine passengers were killed in train accidents. Of the 1978 accidental deaths in Chicago and Cook county, 660 or nearly three times the number of railroad passengers killed, met death on the streets of Chicago and Cook county in 1921 by motor vehicles and in connection with motor traffic. A passenger on the railroad is safer than a man on the streets of Chicago. The relative security of passengers on railroads is recognized by accident insurance companies who pay a double indemnity to a railroad passenger accidentally killed or injured.

Of the 660 fatalities due to motor vehicle accidents in Chicago and Cook county, a train was involved in only 28 of them. In six years 9636 persons were killed and 24,855 injured at highway crossings because someone failed to observe the necessary precautions in attempting to cross a railroad track. The size of our country, and the volume of its railroad traffic, require that heavy trains be run at high speed. By law, by

common consent and desire these trains are given the right-of-way over railway crossings. Grade crossings have been in the past, and for a considerable period in the future, will be a necessity. There is at least one crossing for every mile of railroad in the United States. The construction of a subway for the separation

PROPOSAL TO LINK ALL LARGE CITIES BY TRUNK HIGHWAYS.

THE Associated Highways of America are perfecting plans for a national trunk highway system which will include three of the largest cities in each state, it is stated. At the fourth annual convention of the organization, which will be held in Minneapolis, the discussion of these plans are expected to prove decidedly interesting, according to H. O. Cooley, a member of the executive committee that is making the arrangements for the convention.

The automobile is now used so extensively for traveling that the organization believes a trunk highway system for the entire country is not only feasible, but it is also becoming a necessity.

All the invited delegates to the annual meeting have been sent copies of the maps, which outline the plan in a very graphic manner. It is stated that the members will be urged to use their influence in an endeavor to have the proposed nation-wide road system adopted by Congress.

of grades costs on an average \$50,000. To separate every grade crossing would mean an expenditure of an amount nearly equal to the entire valuation of all railroad property as estimated by the Interstate Commerce Commission.

Railroad engineers are constantly complaining that their nerves are being shattered by "near accidents," which occur nearly every time they go out on the line. On account of the widespread practise of driving cars at a speed of 20 to 25 miles an hour, right to the edge of the right-of-way, the engineer is unable to tell until the last second whether the driver sees the train or not. The great majority of accidents occur at crossings where the view is perfectly open and unobstructed. The driver thinks he has looked or listened, but he has not, or if he has, thinks he can beat the train. Fewer drivers will venture upon the track where the view is obscured without definitely determining whether a train is approaching.

Sympathy with injured persons is natural enough. In the printed accounts of these occurrences in local papers, it is seldom pointed out that they were due to the carelessness of the individual. The fact that persons can be found, who do not recall having heard the engine whistle or bell, is given more weight as proof that no signals were given than the positive testimony of others who heard them. Public opinion is made and the results of the accidents later on may get into the courts.

Three persons riding in an automobile ran into the 13th car from the engine of a 26-car train moving in the yards at four miles an hour. The train was plainly seen by others, but the two occupants of the rear seat of the auto failed to notify the careless driver of the danger ahead.

A crossing bell was ringing. Crossing signals were flashing, trainmen whistled and shouted to the occupants of an auto approaching a crossing so that persons residing near the crossing ran out of the house to see what was wrong. They had time to get out to see the crash, but the driver took for granted that the warnings were for another train on another track.

No mechanical devices and no amount of precaution on the part of the trainmen could have prevented these accidents.

There is but one rule to follow when about to pass a railroad track. One does

*An Address by Samuel M. Felton, President, Chicago Great Western Railroad Company, Before the Graduation Meeting of the Safety Supervisors School, Chicago Safety Council, Morrison Hotel, June 6, 1922.

not need a book of instructions as to how to do this. Signs are located at every crossing cautioning the automobilist that he is approaching a point of danger. Where a curve in the road, an obstruction to the view or other conditions increase the danger distance signals are put out. Nobody can say he approaches a railroad crossing without having been warned. Ordinary common sense should teach him how to proceed, and never, until he knows no train is approaching likely to meet him at the crossing.

The path of the train is confined by the rails. It cannot turn to one side. A long train cannot stop as can a single automobile. The practise of slowing down at railroad crossings should be followed until it becomes a habit. It should be as natural and unconscious a movement as stepping on the gas or applying the brakes. One-half of the fatal accidents on the Great Western railroad in 1921 were highway crossing accidents. Four trespassers were killed. A total of 70 per cent. of the fatal accidents were to outsiders who could, by care, have avoided them.

A general drive for safety first from many directions is of the utmost importance. The careless automobile driver endangers not only his own life and limb, but those of others riding with him, and in case of accidents at railroad crossings, the life and limb of every passenger and employee on the train involved. Only recently a serious wreck was occasioned at a highway crossing by a Lehigh Valley fast passenger train striking a motor vehicle. The growing record of death and injuries, the steadily increasing expense to railroads, and the lamentable loss to the nation each year of hundreds of its highest type of citizens, should awaken both the railroads and the public to the need of a concentrated effort to curb the carelessness that is largely responsible.

The railroads, having the backing of a large number of commercial and business organizations, have inaugurated a "Careful Crossing Campaign," which began June 1st and continues to September 30, 1922. Such a campaign is necessary and timely. In 30 years our country's population increased 68 per cent. Crossing accidents increased during that period 345 per cent. in fatal cases and 652 per cent. in injury cases. In 1921 automobiles were involved in 76 per cent. of all crossing accidents. Seventeen hundred and ninety-one persons were killed and 5077 were injured at railroad crossings in 1921.

The elimination of over 250,000 highway crossings on class one railroads is prohibited for economic reasons. The solution is in education. As education in and discussion of safety matters are responsible for the gratifying results in employee cases, it is logical to assume that education of the traveling public to the exercise of a high degree of care when approaching and passing over railroad crossings will likewise have a good effect in reducing crossing accidents. In the first and last analysis it is the public itself which suffers the pain, the mutilation and fatalities in addition to the financial burdens involved.

Continuous and systematic efforts have reduced the number of deaths and per-

sonal injuries to railroad employees. Our most effective weapon has been an appeal to the human heart.

A great deal of interest has been shown in the remarkable safety record made by the Chicago Great Western Railroad Company in the last 18 months. A word about what that record is and how it was brought about is not out of place. Briefly, every superintendent, supervisor, dispatcher and foreman is thoroughly convinced that the practise and teaching of safety is a part of the operation of the railroad. Each morning is flashed over the wire and placed on the bulletin board of the division the number of days which have elapsed without an injury to an employee on that division. This is followed with a notice of the total number of days during the year without an accident and the number of days on which there was a reportable accident. One of these notices for this year, before me, reads as follows: "One hundred and forty-five days without a reportable accident, five days with a reportable accident. Freedom from pain and suffering is your reward. Let's win the cup this year also."

Comparative statements are prepared showing the standing of the division at frequent intervals during the year. As a mark of recognition and appreciation, prizes are awarded for the best records made in accident prevention as follows:

- 1.—A banner to the division having the lowest number of reportable train service casualties per 100,000 engine miles.
- 2.—A banner to the division having the lowest number of reportable industrial casualties per 1,000,000 man hours (excluding shop accidents).
- 3.—A flag to the division having the lowest number of reportable casualties per 1,000,000 man hours in shop accidents.

These banners and flag are appropriately inscribed and are the permanent property of the division.

A silver cup is awarded the division showing the lowest number of days lost per 1000 man hours due to all classes of reportable casualties. The cup has the name of the successful division engraved on it, showing the year in which the record was made. The division winning the cup three successive years holds it permanently.

All this creates a friendly rivalry between the divisions and departments. The employees take pride in keeping up the standing of their respective divisions.

Periodical safety meetings are held at convenient points. Engineers, conductors, mechanics, roadmasters and station agents are members of the committees.

Three times a year general division meetings are held in which the general officers participate. In the summer months these meetings often take the form of picnics. The families of the employees are present. We can depend on them to keep the safety spirit active in husband, or father, because they are the ones who are so directly interested.

The annual award of the prizes is made a gala day for the division.

The safety movement is designed to save human life. On the Chicago Great Western railroad it is accomplishing its purpose. In 1914 we had 39 killed and 981 injured. In 1918 there were 38 persons killed and 692 injured. In 1921 we had 20 killed and 294 injured. Had the number of persons killed and injured increased in exact proportion to the increase in the volume of business the year 1921 alone would have seen 45 killed and 1128 injured on the Chicago Great Western railroad instead of 20 killed and 294 injured.

The occupational decrease in casualties for 1921 as compared with 1920 is as follows:

Conductors	50%
Station employees.....	68%
Passengers	42%
Roundhouse employees.....	73%
Trackmen	72%

Other occupational decreases:

Brakemen	53%
Firemen	48%
Car yardmen.....	53%
Switchmen	51%
Engineers	47%
Shop employees.....	44%
Bridgemen	54%

Spanish Trail

DRIVERS of cars and trucks visiting the South, or en route through Louisiana to Texas, or further West, will be able to save from four to five hours time by taking the southern route of the "Old Spanish Trail" through Vermilion Parish, turning off of the Pershing Highway at Center street, New Iberia, La., over newly concreted street and hard surface road to Delcambre (pronounced Del-come), Erath, Abbeville, Kaplan, Gueydan (pronounced Gay-don), Lake Arthur and Jennings, where the Pershing Highway is again reached.

THIS line of route is now partly hard surface roads (gravel) known as project No. 25 of the state highway commission. The part of this route which is now dirt road is, except in excessively wet weather, in good condition and passes through the most beautiful section of southwest Louisiana, among the rice, cane, cotton and corn fields, thrifty towns and excellent people, the majority of whom are French speaking. The route is being marked as rapidly as markers can be placed.

Parks are to be established along the route for the convenience of tourists wishing to camp out.

The Vermilion Chamber of Commerce will be pleased to supply any information or service possible.

New International Plant

(By EDWIN A. HUNGER.)

DIRT is flying and concrete is being mixed at Fort Wayne, Ind., for what is soon to be a notable addition to International Motor Truck manufacturing facilities.

Plans for a new motor truck plant have been under way for a number of months; the greatly increased business in Internationals long ago made it apparent to those at the helm that a greatly enlarged plan of manufacture would be necessary. A new and thoroughly up-to-date plant in a new location suitably situated as to railway connections and proximity to Harvester raw material supplies immediately suggest-

ed itself. Accordingly, a search for a site was inaugurated by a staff of engineers in the usual manner of Harvester thoroughness and before the present place at Fort Wayne was selected dozens of possible locations were studied and considered.

Fort Wayne, a city of 90,000 people in northeastern Indiana, was finally selected because of its favorable geographical position and excellent railway connections, being served as it is by five important railroad systems. The friendly and cooperative spirit evinced by citizens of Fort Wayne no doubt also has been an important factor in the selection of the present site.

THIS spirit of cooperation has marked itself by many tangible deeds, noteworthy among which has been the formation by Fort Wayne citizens of a \$1,000,000 stock company, the Greater Fort Wayne Development Corporation, the primary purpose of which is to supply 1000 new homes for International Harvester men and their families. Also, two superb 30-foot heavily steel reinforced concrete highways have been built to connect the plant which is three miles out from the city proper. An \$80,000 main sewer from the plant to the Miami river some distance away is an additional project engineered by the city of Fort Wayne to show that it wants to get the new plant started right and that it believes in and is strong for the International Harvester Company.

The new plant site consists of 143 acres and is on the Chicago-New York main line of the Pennsylvania railroad. At present three substantial buildings of steel, concrete and brick with wood block floors and gypsum roofs and a power house with a total floor area of 200,000 square feet under cover are in process of construction, actual work having been started May 22. Eventually it is planned to have five buildings.

Of course in a well rounded, smooth-running machine such as International Harvester, sudden jumps and jerks in the manufacturing programme are not in order and so the

working in of the new Fort Wayne plant to function with production of other plants devoted to the making of motor trucks will be gradual. Hence at the start the new plant will be devoted chiefly to assembly operations. This work of taking parts made at other factories and putting them together in the complete chassis will most readily lend itself to the new plant organization and enable it to relieve most quickly the load carried by the other plants. Eventually as the plant gets going what may be called the second division will be developed by the completion of buildings A and B. Looking to the future, space has been reserved for all phases of production, and the machining and assembling of units that make up the chassis (transmissions, engines, axles, fabrication of fenders, hoods, etc.) may be taken on. Finally, what we may call the originating production division such as foundries, forge and wood shops, etc., will be installed. These developments will follow as fast as the sales demand requires. With such careful plans worked out, therefore, nothing but the best as heretofore will be turned out in the way of International Motor Trucks at the new Fort Wayne works.

Buildings C, D and E now being built will be so arranged that they will be specially well fitted to take on the work of assembly, as soon as they are completed, which will probably be some time next winter. Building E will be a large single-

story structure with saw tooth type of roof, and will have railroad tracks on each side so that cars can quickly be unloaded. This building will be the place where parts such as engines, transmissions, axles, etc., from Akron and other factories will be received. It will be devoted to storing of these parts and their assembly into the chassis and also the painting of the finished chassis. This work of assembly will, moreover, be carried on to part of building C, one-half of which will be two stories high and the other three stories, this latter, due to the contour of the land, having its ground floor one story below the ground floor of the other part. Building C will also house the testing department.

Building D will be of saw tooth roof construction and will be devoted largely to storing and shipping.

J. D. McGann, who is in charge of construction at the Fort Wayne plant, is an old Harvester man with 19 years' service to his credit. He is well known for his work in charge of building the tractor works at Chicago. Mr. McGann is serving directly under the works manager-ship of Cyrus McCormick, Jr., who is full of enthusiasm for the new Fort Wayne location. He thinks it is ideally adapted for this newest of International Motor Truck plants and provides all those facilities for efficient production, central distribution and easy expansion that ought eventually to go far toward making it one of the leading plants.

FOILS CRIMESTERS

IN THIS present wave of crime and daring hold-ups, banks, trust companies, construction companies, contractors, chain store organizations and silk houses find it necessary to use every precaution of safety for the men involved in the transfer, delivery or collection of large sums of money or valuable goods.

The motor truck is used extensively for this form of transportation, but the usual type of motor truck body does not offer adequate protection, so in order to over-

come this hazard a special body has been designed, the appearance of which is misleading to the highway man, due to its similarity to the ordinary light delivery body. The entire interior is lined with a light tough bullet-proof steel, capable of resisting the largest revolver bullet at close range. All the windows, windshields and port holes are fitted with shatterless bullet-proof glass, and the windows and port hole shutters are fitted with geared window lifts to hold them in any position desired.

NO RUNNING boards, door handles or other unnecessary projections are afforded the thug who attempts to hold up the truck while in motion. A step is provided at the entrance door of course, but it automatically folds up when the door is closed. In place of the usual seat in the cab running its entire width, a single driver's seat is provided, which makes available a space for a locked door connecting the cab with the body.

In addition to the driver in the cab it is customary to carry one or two guards inside the body. These men deliver the securities from the truck to the destination under the protection of the driver. They in turn protect the driver and the car en route. The inside of the body is provided with folding cushion seats, dome lamps, ventilators in the roof, and an exhaust heater for use in cold weather. Several rifles and revolvers are supported on convenient racks and are kept loaded for instant action. The six port holes provided, including one opening back of the cab, give ample range to reach any point, near or distant, on all sides of the truck. An extra emergency brake is fitted inside the body operating independent of the cab controls, so that the men in the body have control over the truck in case of accident to the driver.

The Mack chassis equipped with rubber shock insulators is particularly well adapted to this service, as it affords the ease of riding of a pneumatic tired truck without the danger of puncture or blow out, which would prove fatal in case of an attack. In this construction the ends of the springs are embedded in

blocks of live resilient rubber carried under pressure in a cast steel box that forms a part of the spring bracket at either end of the spring, eliminating the customary steel shackle with its accompanying spring eyes, bushings, shackle bolts and shackle nuts. It might be said that the chassis and body literally floats on eight blocks of live rubber, which act in the capacity of auxiliary shock absorbing members, and accordingly much of the vibration

USE TRUCKS IN HAULING GRAIN AND FEED.

Hauling wheat and flour several hundred miles a day over rough Texas roads is what one GMC truck faces as part of its usual daily routine, according to a report to the General Motors Truck Company at Pontiac, Mich., from the Globe Mills, in El Paso, Tex., the largest dealers in grain products in the southwest.



A Bullet-Proof Body of This Type, Together with a Couple of Determined Guards—and the Most Hardened Pay-Roll Thieves Would Hunt a Hole.

present in the ordinary solid tired vehicle is eliminated.

There is a small desk in the forward part of the body for the convenience of paymasters and collectors and a paying teller type window is also provided for paymasters.

All doors are equipped with patented locks and a forced entrance would be practically impossible even though the truck was not in motion.

O. J. Allen, secretary and manager of the company, writes the factory that for years GMC trucks have been hauling tons of grain products over the country roads in Texas on an average of 50 miles daily, but his company is so enthused with the service given that they intend to branch out and deliver to cities along the Rio Grande river and the Mexican border for a distance of 40 and 50 miles.

Motors Will Care for Passengers

In Event of Strike Becoming Serious Country Now Has Ample Facilities for Transportation Immediately Available Says Vice President Chapin.

(By ROY D. CHAPIN, Vice President, National Automobile Chamber of Commerce.)

MOTOR cars and buses will care for the traveling public in any crisis that may occur.

The chief problem will be not in providing enough motor cars and motor buses in our large cities, but to arrange for adequate parking spaces.

There are three main types of passenger traffic by railroads:

1. City workers, traveling between suburban areas and business.
2. Salesmen and executives, traveling from city to city.

IN ADDITION to the privately owned cars there are 20,000 buses in the United States and thousands of taxicabs.

Enough Cars to Carry Adult Population.

Within a 40-mile radius of each of the seven largest cities in the country there are enough cars to carry the entire adult population to business, as indicated by the following table:

vided emergency traffic organizations in preparation for cars, as well as for trucks which are, however, for motorists may be provided.

Business Houses Using Cars for Salesmen.

The traveling representatives of business will also be protected in the event of a rail strike. Analysis of state registration cards shows that in Massachu-

3. Vacationists.

Group one is the largest element in rail passenger travel. The suburban areas surrounding our large cities have been built up by the motor car in conjunction with the railroads. The rail lines form the main streams of travel with motor cars feeding into them. Every third family in the suburban district owns a motor. The business man in normal times is likely to find it more convenient to drive to the station than directly to the city, but in a crisis he can drive directly into work taking his neighbor with him.

said, "We have demonstrated that each salesman's sales increase from 40 per cent. to 100 per cent. as soon as he begins to operate a motor car. This is because he works from six to eight towns a day where he formerly made from one to four."

Suspension of railroad service over short distance routes then would not seriously inconvenience the traveling personnel of many business concerns. Failure of rail service over long distances would, of course, create serious inconvenience to long distance business travel, though essential trips could be handled over the transcontinental highways.

A Million Motor Campers.

One department of travel in which there is little need for worry is that of vacation trips. The use of the motor car for holiday tours is constantly gaining. Over a million persons went motor camping last year. More than 300 cities now have municipal camp sites. There are many additional moderate priced commercial camps for motorists and large areas for this purpose in the national parks and forests.

Charles E. Buysse, formerly secretary and treasurer of A. A. Treadway, Inc., Detroit, has been made sales engineer for the Ever-Hot Heater Co., also of Detroit.

Max R. Smit Kleine has been made factory manager and chief engineer in the gasoline motor department of G. Kromschroeder, A. G., Osnabrueck, Germany.

A. Ludlow Clayden has been appointed chief engineer of gas engine research for the Sun Company, Philadelphia. He was formerly manager of the radiator department of the United States Cartridge Company, Lowell, Mass.

Albert W. Happel, who was previously a member of the engineering staff of the Willys-Overland Company, Toledo is now associated with the Kent Owens Machine Company, also of Toledo.

	Motor Car Regis.	Number Adults	No. Adults Per Car
Suburban area of New York.....	221,645	1,816,588	7
Suburban area of Chicago.....	100,826	588,619	6
Suburban area of Philadelphia.....	75,474	581,689	7
Suburban area of Detroit.....	40,000	223,168	6
Suburban area of Cleveland.....	56,370	325,650	6
Suburban area of St. Louis.....	30,982	266,486	8
Suburban area of Boston.....	120,200	816,471	7

As the majority of the women in the adult population are not engaged in business, and as some of the men in suburban areas are locally employed the ratio of one car to every six or eight adults is a sufficient emergency force as far as rolling stock is concerned.

Long Island an Example.

The suburban situation is well exemplified by the traffic conditions on Long Island, a territory near New York City which has an adult population exclusive of the counties in the Metropolis of 131,000 and a motor car registration of 22,300 or one for every six persons. These cars in normal times are feeders to the Long Island Railroad. The passengers carried total of this road has been increasing each year with the gain in population and motor vehicles in its territory. In an emergency this traffic could be carried in motor cars, but the City of New York would need to provide parking spaces for 22,000 cars, as well as for trucks which are, however, moving more constantly.

Several of the larger cities have pro-

vided emergency traffic organizations in preparation for cars, as well as for trucks which are, however, for motorists may be provided.

There are plenty of cars and buses in suburban areas to carry the business population to work.

Provision of parking spaces will be the chief problem.

Thousands of business houses are today equipping their traveling men with motor cars.

Vacation land will not suffer.

Highways mean public protection.

(Continued from Page 413.)

the driven discs to increase the driving power of the clutch. It sometimes becomes necessary to renew the cork inserts. When this is being done great care must be taken to make the new inserts flat and true, or otherwise a full bearing surface will not be obtained, which is necessary to properly handle the transmission of power.

These corks may be properly dressed off if a surface grinder is available and plenty of water is used, but if no machine of this type is available a fair and workmanship job can be turned out on an engine lathe. The corks should be thoroughly soaked in water and

the cutting operation is in progress.

The Plate Clutch.

The disc clutch and the plate clutch are somewhat similar in their construction and many persons are somewhat confused as to just what is meant by each of the terms.

A plate clutch is one in which a single plate is clamped between two others, while a disc clutch is considered to be one in which more than three discs are used. In the plate clutch used by many makers of automobiles the entire assembly with the exception of the clutch sleeve, transmission shaft, the driven plate and the facings revolve with the flywheel, when the engine is operating.

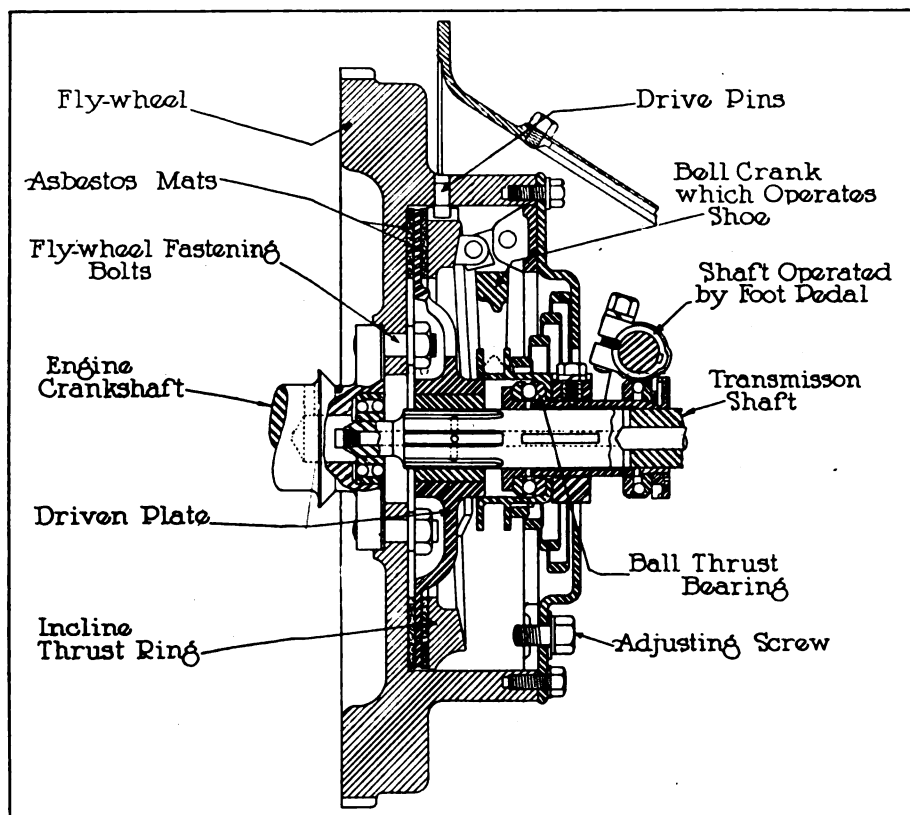
When the foot pressure is re-

leased the driven plate and the clutch shaft stop revolving, but the rest of the clutch may still be revolved.

One side of the thrust ring, which operates against the asbestos facing, is a flat polished surface, while on the other side are three cam surfaces against which the wedge shoes exert pressure. This face is radially inclined to properly permit the action of the thrust shoes, while the three cam surfaces allow adjustment for wear of the asbestos facings. The thrust ring is made fast to the flywheel by three equally spaced dowel pins, which permit enough play in this ring to adequately provide for a slight forward or backward movement as the clutch is engaged or released. The three bell crank levers are carried on the adjusting ring, which transmit the action of the spring to the thrust ring and asbestos facings.

The adjusting ring is carried on the clutch cover by two bolts, which fit in machined slots. This allows the adjusting ring to be moved in a right or left hand direction. When moved to the right it brings a thicker part of the thrust ring in contact with the thrust shoes and causes the clutch to grip harder, while if it is moved to the left it brings the thin portion of the cam faces under the thrust shoes and therefore reduces the friction effort of the clutch.

Many drivers when operating a car having a lubricated disc clutch employ practise of continually slipping it, instead of taking trouble to shift gears. This is exceedingly poor practise when employed constantly, as it places a much greater strain on the clutch mechanism and uses up the lubricant within the clutch casing. If this lubricant is not replenished there is a great possibility of scoring or burning the discs, which will mean a considerable outlay of money. The clutch of any car should be treated with consideration and if it does not operate properly it should be made to do so without delay. Should the clutch start to slip it should be adjusted immediately for this action wastes fuel and causes damage.



This Plate Clutch Operates Without Oil and Is Very Easily Adjusted.

pressed into the holes of the discs. Then the discs may be fastened to the face plate of the lathe, using thin steel parallels between the face plate and disc in order to prevent the cork inserts from striking the lathe face plate and throwing the disc out of true.

Clamps and bolts may then be used to make the disc fast.

A tool with plenty of rake should be used in dressing down the cork and the lathe spindle should be revolved at a good rate of speed while

leased from the clutch pedal the friction plate is wedged between the flywheel and the thrust ring of the clutch by three bell crank levers, which are actuated by a cone shaped spring.

The driven plate is splined and fitted to the clutch shaft and rotates between two wire corded asbestos rings or facings, which are independent of the driven plate, the thrust ring and the flywheel. These facings absorb the wear when the engagement of the clutch is taking

Coal Lack Handicaps Steel Mills

PRODUCTION of pig iron and steel continues on the down grade, steel mills and by-product coke ovens exhausting their stocks week by week, and they are now receiving smaller coal supplies than during the past few weeks. Steel ingot production is probably at the rate of about 30,000,000 tons a year, a decrease of from 15 to 20 per cent. in two months. A number of steel consumers are also running out of coal. The condition of the market gives the impression that the curtailment in consumption is less important than the curtailment in production. The prospect is that pig iron and steel production will continue to decrease until the middle of next month, even if a settlement of the two big strikes comes soon.

THE market on bars, shapes and plates is up again, with 1.80c as minimum. Certain companies notified customers this week that prices had advanced to 2.00c. This is interpreted as a move to discourage customers from buying because of the scarcity of coal. Small lots for prompt shipment are selling easily at a premium of \$2 a ton, and the market is quotable at 1.80c to 1.90c.

A special price of 2.75c is now the rule on hoops under one inch in width. Some mills have quoted a special base price on narrow hoops, and this has crystalized into a regular splitting of the list, so that the usual quotation is 2.50c base, on one inch and wider, and 2.75c on narrower hoops. Production of hoops and bands has been materially restricted in the last three months, resulting in an accumulation of orders on mill books. Numerous small or-

ders are being placed.

As a general average mills seem to be sold up for about 10 weeks on butt weld, and more than half as long in lap weld. The heavy demand is, of course, attributable to the great building boom that has been in progress for some time.

Some mills report demand for all country goods as very materially decreased in the last two or three weeks, while others state that they have observed no change. Pipe mill operators in the valleys have been decreasing in the last two weeks. The leading interest maintains the production rate of a month or more ago, but may not be able to do so much longer unless the coal situation suddenly loosens up. Prices on tubular goods are firm on the basis of the published lists. So far as reported, none of the mills are securing delivery premiums.

The mills are sold up fully at

their present operating rates, from Sept. 15 to Oct. 1 or even a trifle later. The market is very firm on the basis of \$4.75. For the fourth quarter there is practically no markets; buyers do not feel disposed to act at present.

Consumers are showing little disposition to pay fancy premiums, as they did so enthusiastically a couple of years ago. There is some buying premiums, but not much in a point of tonnage. The number of sellers is greatly restricted, as the average mill is oversold already. The automobile trade is most affected by the situation, being decidedly short of sheets.

Prices are largely nominal. The general market basis may be quoted at 2.40c to 2.60c for blue annealed, 3.15c to 3.30c for black, 4.15c to 4.30c for galvanized and 4.50c to 4.85c for automobile sheets, and higher for small prompt lots.

VANE FINDS FARMERS GOOD PROSPECTS

AUTOMOBILE and truck sales to farmers in the Fall months depend now absolutely upon the perfection of the corn crop, which is everywhere in splendid condition at this time, and upon the settlement of the industrial situation, according to General Manager C. A. Vane of the National Automobile Dealers' Association, who has just completed a 500-mile motor trip through the farm sections of Missouri and Illinois, talking with farmers, automobile and truck dealers and country bankers.

"WHEAT generally has netted splendid yields; the problem confronting the farmer is getting his crop into the market and turning it into cash. Curtailed train service, due to the shopmen's strike, has already resulted in a serious crippling of shipping facilities, and if the strike grows worse there will be a loss of millions of bushels of grain because of the poor storage facilities generally existing on the farms.

"An Illinois dealer reports that several farmers came into his establishment and counted out the price of a machine in five, 10 and 20 dollar bills. The dealer had never before considered these men prospects.

"The coal strike is having its effect in the mining region. A dealer in a town of about 3000 with a 10-car contract, had delivered eight cars up to the time of the calling of the coal strike, April 30. He informed me that he was set for 25 de-

liveries this year until that happened. The strike wiped out a payroll of \$120,000 a month in his town. 'Unless they settle this strike pretty soon,' he said, 'we will be lucky to get the other two cars over.'

"A motor trip through Illinois impressed one, as a train trip never can, of the vast resources of the agricultural sections of this country." This is due to the ease with which the motor car reaches these places.

Interesting Book on Highways Ready for Distribution

Many Well Known Authorities Collaborate in Compilation of Pamphlet That Discusses in Detail Various Problems of Motor Transport Service.

WASHINGTON, D. C., Aug. 14.—The problems involved in highway transport and highway economics are discussed at length by leading students from engineering and automotive fields in a new booklet now ready for distribution by the Highway Education Board.

Modification of truck design to fit the road, subsidizing of highway transport by the construction of market lanes, predictions of future traffic changes and economical types of roads are four of nearly two score problems raised and discussed authoritatively in the bulletin.

In addition a chart of the field of highway research prepared by Dr. W. K. Hatt, formerly of Purdue University, now director of highway research for the National Research Council, forms an instructive and suggestive part of the brochure.

The booklet itself is a report of a conference held on these subjects at the University of Maryland, attended by leading economists, engineers and manufacturers. It was edited by Professor C. J. Tilden, former director of the Highway Education Board when it was known as the Highway and Highway Transport Education Committee. After a year's leave of absence he has returned to Yale University, where he is professor of engineering mechanics. The conference was presided over by President Charles S. Howe, Case School of Applied Science, Cleveland. Features of the report include a paper by Thomas H. MacDonald, chief of the U. S. Bureau of Public Roads, and an analysis of highway legislation.

The bulletin is being distributed by the Highway Education Board, Willard building, Washington.

George D. Brimble has opened the Brimble Tire & Supply House, Chelsea, Mich.

BUSINESS MEN FEEL IMPETUS OF RETURNING BUSINESS.

THAT the automotive dealers of Boston and of other sections of Massachusetts are feeling strongly the impetus of returning good business is indicated by the manner in which they are preparing for it by the provision of that most essential factor to active business—reliable and rapid transportation of merchandise. The fact that more office building, factory, garage and dwelling house construction is in progress now than for several years is a potent sign of the return of good times; as are also the widening of streets, building of new roads, the contemplated erection of a 1200-room hotel in Boston and the settlement of labor troubles, particularly in the shoe cities.

WHITE FIGURES SHOW BIG DISTRIBUTION.

CLEVELAND, Aug. 10.—An idea of the big growth of motor truck transportation the last decade is gleaned from statistics recently compiled by the White Company. This company, which is one of the pioneers in the motor truck industry, has been manufacturing gasoline trucks for about 13 years, but it is only in the last six or seven years that production and use of the motor truck has reached large proportions.

The first of the year 506 owners were operating 18,527 White trucks in fleets of 10 or more. This same list of owners 12 years ago were

operating the insignificant number of 60 trucks. The great majority, of course, did not use motor trucks in 1910. A few operated one or two. There is just one outstanding exception and that is W. & J. Sloane, the well known New York furniture and carpet merchant. This establishment in 1910 was operating 13 Whites. Today this pioneer fleet has grown to 31.

The owner of the largest individual fleet on the White list is the Gulf Refining Company, with 1177 trucks, representing an investment of more than \$3,000,000. The Gulf Refining did not operate trucks in 1910, but purchased one the following year. In 1914 the company had 81 trucks in service and since then has added from 100 to 200 trucks to their fleet each year.

A few of the other fleet owners are the Associated Bell Telephone Companies with 806, the Standard Oil Company of New York, 649; Union Oil Company of California, 534, and the United States Postoffice Department, 665.

In addition to the users who operate fleets of 10 or more there are 5411 owners operating fleets of less than 10, totaling 33,284 trucks, making a grand total of fleet owners of 5917 and the number of trucks they operate 51,811. There is a host of owners who do not operate fleets.

Another interesting angle of the White Company's tabulation is that 15 owners have invested more than \$20,000,000 in Whites. The total value of all Whites on the road is well in excess of \$180,000,000.

Maurice R. Woodrow has accepted a position as salesman for the Congoleum Company, Incorporated, Kansas City, Mo.

E. S. Gorrell is no longer industrial engineer for the Nordyke & Marmon Company, Indianapolis, but is now associated with Frank E. Wing, Boston.

Norbert S. Atwell is now joint proprietor of the Atwell Auto Service Company, Chillicothe, O.

Frederick A. Clawson, until recently Midwest sales representative for the Ericsson Manufacturing Company, Buffalo, has become affiliated with the Westinghouse Union Battery Company, Chicago.

M. W. H. Wilson is now associated with the Motor Wheel Corporation, Lansing, Mich. He was formerly assistant works manager of the Willys Corporation, Elizabeth, N. J.

Millions of Dollars Worth of Relic Trucks Still to Come

Battle Scarred Veterans Already Given to States to Be Added to by Equipment Used by Army of Occupation Which Will Be Brought Back Home.

WASHINGTON, D. C., Aug. 11.—More than 24,000 motor trucks and 45,000 passenger automobiles have been distributed throughout the United States as part of the \$139,700,000 worth of surplus war materials brought back from overseas following the war and up to July 1. This statement is part of a resume of the activities of the Bureau of Public Roads, Department of Agriculture, issued this week. All this material is to be used in road construction, the bureau declares.

The material, which consisted of all sorts of supplies and equipment suitable for road building, was distributed on the same basis as monetary Federal aid. In value of material delivered, Texas and New York lead with nearly \$8,000,000 worth, and every state with the exception of five of the smaller ones received supplies valued at over \$1,000,000. There is hardly a county in the United States in which some of the supplies have not been used.

The system of distribution has been so arranged that the states requisition only material useful to them. In some cases they fall behind in allotments in order to wait for material particularly desired. Many of the states have shown great ingenuity in conditioning worn equipment, using war material to equip shops in which other war materials made suitable for use.

There is still a large quantity of material in this country for distribution. This will be further increased by material used by the army of occupation in Germany soon to be brought back.

Clarence M. Foss has been made engineer and works manager of the Walker M. Levett Company, New York City, having been sales engineer for the same company.

BIG PRODUCTION FORECAST IN MOTOR TIRES.

ECONOMIC experts predict a production of 40,000,000 automobile tires in 1923. The figure is based on what is regarded as a certainty that 11,000,000 will be made this year. Average annual tire consumption is figured by the manufacturers at about $3\frac{1}{2}$ tires per car. Consumption this year is set at about 33,000,000. A production of 40,000,000 tires would utilize all the present unoccupied space in the Akron factories.

FOREST SERVICE REBUILDS CHATOOGA RIVER BRIDGE.

WASHINGTON, D. C., Aug. 15.—Expenditures of \$10,818 of National Forest Highway funds for the maintenance of eight miles of the Three States road in Georgia and for the rebuilding of the Chatooga river bridge on this road near Walhalla, South Carolina, have just been approved by Secretary of Agriculture Wallace. This money was made available for roads of primary importance to the state, counties or communities within, adjoining or adjacent to the National Forests.

Two projects have been approved, both within the boundaries of the Nantahala National Forest. The present Chatooga river bridge will be entirely reconstructed in accordance with standard specifications at a cost to the Federal government of \$8000. In addition $8\frac{1}{2}$ miles of the Three States road, from the North Carolina line to the Chatooga river, will be maintained and additional drainage installed at a cost of \$2818.

This programme for improvement was recommended to the secretary of agriculture by the Forest Service and the Bureau of Public Roads jointly, after conference with state officials. The construction of the bridge will be handled by the Bureau of Public Roads.

SIGNAL TRUCK ANNOUNCES NEW PRICES.

DETROIT, Aug. 12.—The prices at which the Signal Truck Corporation is to market its product should meet with the immediate approval of the prospective truck purchaser. The present commercial vehicle which this company manufactures is the result of many years' experience and honest endeavor to place before the public a truck that would be long lived, dependable and low priced. The present list is as follows:

Model NF, 1 ton (pneumatic tires) \$1450
Model H, $1\frac{1}{2}$ tons (solid tires)....\$1950
Model J, $2\frac{1}{2}$ tons (solid tires)....\$2375
Model M, $3\frac{1}{2}$ tons (solid tires)....\$3175
Model R, 5 tons (solid tires).....\$3900

List prices effective Aug. 1, 1922.

F. O. B. Detroit, chassis with seat.

Models J and M long wheelbase. Net extra \$100.

Above prices subject to revision without notice.

ACME DISTRIBUTES NEW TRADE CATALOGUE.

CADILLAC, MICH., Aug. 12.—A well compiled and most instructive catalogue is being issued by the Acme Motor Truck Company. It contains data and interesting information relative to this company's product, which should prove of decided value to all persons interested in the development of the motor truck.

The book is nicely illustrated with special half-tone cuts, showing the various models on one page while on the opposite page is the data of this particular model. In the center of the book is a two-page spread, which brings to the reader's attention, in a striking manner, the many distinctive features of this product.

Widespread Interest Aroused by Inquiry Into Gas Prices

Investigation Will Be Most Searching in Many Years—Motorists and Trade Bodies Urge That Every Effort Be Made to Get at Real Facts in Case.

WASHINGTON, Aug. 15.—Although tariff and other legislation has delayed action in the Senate Commerce Committee's inquiry into oil and gasoline prices, there is every indication that the investigation will be one of the most searching conducted in recent years. It is now expected that the hearing will be under way again the latter part of next week.

Several well known oil men have offered to testify at any date which will suit the convenience of the committee. The time for hearing them will be made public later.

Letters from motorists and automobile associations throughout the country have been received here urging that every effort be made to get at the cause of the increase of price in gasoline last spring at a time when the reserve stocks were said to be the largest in the history of the country.

18,000 RURAL SCHOOLS DEPEND ON BUSES.

NEW YORK, Aug. 14.—Eighteen thousand rural schools are furnishing transportation for pupils to and from their homes. Through the motor bus the consolidated rural school is made possible, and the number of consolidations is going forward at the rate of about 1000 per year. There are still 180,000 one-room schools which should be consolidated.

Since a consolidated school combines several adjacent school districts into one school it means a larger and better equipped schoolhouse. Since in the one-room rural school one teacher teaches all grades from the kindergarten to the eighth grade, while in the consolidated school each teacher instructs

but two or three grades—this means fewer and more highly qualified teachers and better teaching.

WEST NORTH CENTRAL STATES LEAD FARM TRUCK CENSUS.

MORE motor trucks are used on farms in the West North Central states than in any other section of the country, according to United States Bureau of Census figures. Minnesota, the Dakotas, Iowa, Missouri, Kansas and Nebraska have 33,000 trucks on farms.

It quite naturally happens that farmers of these states, according to figures compiled from income tax returns, also lead those of all others except the Pacific states in the matter of yearly incomes, many of them paying taxes on a yearly income in excess of \$5000; the average for all farmers in the state being \$2300.

Indorse New Jersey Road Plan

PATTERSON, N. Y., Aug. 12.—The Pierson \$40,000,000 good roads bond issue, which comes up for referendum vote in New Jersey in November, has been indorsed by the Automobile Dealers' Association of Bergen County. Secretary Harry D. Meixell of the Good Roads Association of New Jersey, who recently addressed the members on the subject, pointed out the need for funds to complete the state highway programme, and said that unless the bond issue passes in November there would be a five-year holiday in road

building, which would result in great loss to the state. He also explained that the bond issue would not add to present taxation and that the present income would be sufficient to take care of the interest and retiring fund of the bonds, which are to be used for both highways and bridges.

H. A. Oswald has resigned as general manager, secretary and treasurer of the Hamilton Motor Co., Grand Haven, Mich., to become manager of manufacturers' sales for the Truscon Laboratory, Detroit.

Herman Hollerith, Jr., has become associated with the Holmesburg Oil Storage & Barreling Company, Holmesburg, Philadelphia. He was formerly secretary and engineer for the Robertson Lubricants Company, Philadelphia.

H. Eugene Pengilly, formerly connected with the Triplex Machine Tool Corporation, New York City, has become mechanical engineer for the Standard Oil Company of New York, located at 370 Seventh Avenue, New York City.

Hadley Smith has accepted a position as designer for the Hupp Motor Car Corporation, Detroit. He was previously associated with the Pierce-Arrow Motor Car Company, Buffalo, N. Y.

M. O. Jensen has become affiliated with the Kaw Engravers, Kansas City, Kan. He was formerly experimental engineer for the Imperial Brass Manufacturing Company, Chicago.

James T. Dykstra, who was formerly connected with the Dare Aircraft Company, Detroit, is now associated with the Detroit Steam Motor Corporation, also of Detroit, in the capacity of chassis engineer.

F. H. Rees has been transferred from the New York office of Willys-Overland, Incorporated, where he was assistant retail sales manager, to the Boston branch of the company in the capacity of retail sales manager.

R. H. Collins has been elected president of the Peerless Motor Car Co., Cleveland.

Harold H. Smith has been appointed district manager for the Philadelphia Storage Battery Company, Philadelphia, with headquarters at New York City.

B. Russell Shaw has been appointed secretary of the contest committee of the Aero Club of America, New York City. He was previously consulting aeronautical engineer for the Lawson Airplane Company, Milwaukee.

James E. Erskine, formerly chief engineer for the Perfection Engineering Products Corporation, Jacksonville, Fla., has formed the Erskine Engine Company, located at 920 Main street, that city.

Harry L. Hamm, formerly automotive instructor at the Air Service Mechanics School, Chanute Field, Rantoul, Ill., has been appointed branch service manager at Buffalo for the Republic Truck Sales Corporation.

California Motor Bus Lines Pay Fine Interest on Investment

Automobile Passenger Stages Earn Far Greater Profits Than Common Carrier Freight Motor Truck Lines According to Figures of Railroad Commission.

SAN FRANCISCO, Aug. 13.—Automobile passenger stage revenue in California far exceeds the earnings of common carrier freight motor truck lines, according to figures gathered by the California Railroad Commission.

Out of a combined revenue from passengers, freight, express and other sources of \$14,831,179 for 1921, passenger earnings totaled \$7,991,312, and freight, \$3,408,152.

Twenty-three stage lines showed gross earnings over \$50,000, one company taking in over \$1,000,000 and three others over \$250,000. Total revenue for the 23 lines was \$5,544,515, expenses \$5,462,750, net \$81,765. These companies reported an investment equipment of \$2,588,424.

Twenty freight and express lines had revenues of over \$50,000. Their total revenue was \$2,060,530, expenses \$1,196,997 and net \$863,533. Equipment investment was \$683,915. Though they apparently showed a greater net return than the stage lines, a large proportion of these truck lines are of comparatively recent origin and only one of them had a gross revenue of over \$200,000, while the stages have a history of steady growth and consolidation, a few of them now dominating the passenger business in the state.

The largest stage line in the Motor Transit Company, which operates a network of routes out of Los Angeles, gross revenue was \$1,618,893, while the California Transit Company, dominating the Sacramento and San Joaquin Valleys, took in \$834,295.

R. H. Cosgrove, formerly engineer of the Glenwood Engineering Co., East Cleveland, has become associated with the Hoover Suction Sweeper Co., North Canton, Ohio.

GEORGIA STREET RAILWAY LARGE AUTO FLEET OWNER.

ONE hundred and six motor cars and motor trucks are owned by the Georgia Railway and Power Company. This is one of the largest fleets of motor vehicles in the state. Preston S. Arkwright, president of the company, says "the time will come when he will be using automobiles as public transportation vehicles in territory where the business would not justify the building of rail lines."

LACK OF COAL NOW IS PROBLEM.

DETROIT, Aug. 12.—The automobile industry, in the height of its post war boom, is threatened with a serious shut down within the next 15 days as the result of the railroad and coal situations.

With production for the balance of this year set at figures which threatens to eclipse even that of 1920, when any kind of an automobile which would run was marketed, the various manufacturers fear that another depression may set in.

Even Ford, with his vast resources, coal mines and railroads of his own, not touched by either strike, is at the end of his parts and coal supply, and must close in 15 days if coal is not secured. This shut down alone would throw 72,000 men and women out of work in Detroit and Dearborn.

To meet a situation such as existed in 1919, the Ford company, unable to secure freight cars and adequate haulage facilities, has done

something which is almost unprecedented in the annals of the great concern, and that is, ship complete cars via boat, driveways and what train space may be secured.

The same situation exists in nearly every other big automobile factory in Michigan and Ohio. These companies are unable to get shipments of raw materials through and while many have on hand enough to last them, they believe, until the end of the railroad walkout, the coal situation complicates matters a great deal.

Many large truck and car manufacturers are hard hit for want of coal and the tire factories in Akron are facing a serious curtailment in their production unless something can be done to give them the means of providing power to run their machinery.

It is current talk that the manufacturers feel they have been rather shabbily treated by the Interstate Commerce Commission in the question of priority orders, and C. S. Scott, vice president of the General Motors Corporation, has openly taken the field in criticising this government agency for its failure to provide for the automobile industry in the priority schedules.

Albert F. Wagner is no longer owner, manager and engineer of the Wagner Specialty Company, New York City, but is now chief engineer and production manager of the Arecibo Grape Fruit Company, Manati, Porto Rico.

C. L. Pfeiffer has accepted a position as body draftsman with the Fisher Body Company, Detroit. He formerly held a similar position with the Seaman Body Corporation, Milwaukee.

Elmer P. Smith has been made assistant engineer for the Warner Gear Company, Muncie, Ind.

Earl A. White has accepted the position of field editor in the Chicago territory for the Class Journal Company, New York City. He was formerly technical editor of the Farm Implement News, Chicago.

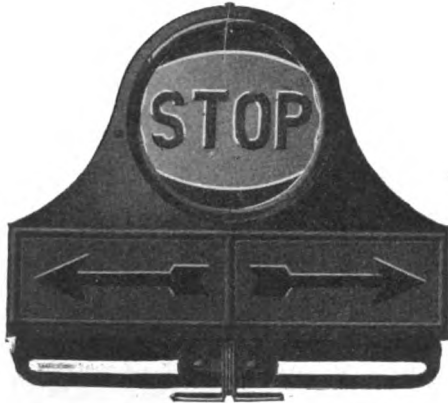
T. A. O'Connor has been made Detroit service manager for the Studebaker Corporation of America. He was formerly service manager in charge of service, repairing, new cars and stock for the Western Motors Company, Los Angeles, Cal.

A. M. Dean has resigned as chief engineer of the Templar Motors Company, Cleveland, the position that he has held since the formation of the company. He will in the future be connected with the Rubay Company, also of Cleveland, in a similar capacity.

ACCESSORIES DEPARTMENT

Apcolite Signal gives a positive, unmistakable and timely warning of a driver's intention to turn or stop. It is simple to install, simple to operate and plainly seen in day or at night time.

The prismatic effect caused by the specially designed backs of both the stop and arrow lenses, secure the greatest possible



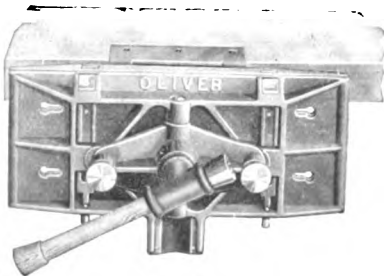
amount of light both by day and night.

It is made of cold rolled steel, with spot welded joints. There is nothing to work loose or get out of order and absolutely no moving parts to rattle while car is in motion it is claimed.

The light is automatically operated by means of the foot brake. Right and left arrows are controlled by means of a lever switch so located that the hands do not have to be removed from the wheel for the operation of this switch.

Manufactured by the Arrow Products Company, 248 Congress Street, Boston, Mass.

Oliver No. 1 Universal Vise is designed to overcome objectionable features of this type of vise. The jaws are 7¼ inches wide, 18 inches long, will open up to 16 inches. Heavy ribs to the corners of the jaws, also to the center of the clamping strain point, assure great rigidity and holding power the whole length of the jaw, and not only in the center. The



screw is steel 1½ inches diameter with buttress thread, it has a self-centering and detachable nut, which can be easily removed for replacement. Note the rigid

construction of the trunnion, which is part of the back jaw; also the clamp lever used for clamping the jaws in any position in the complete circle. The beam or bar is so constructed that the metal filings, when working on metal patterns, will not fall into the screw and wear the threads. This is a decided advantage and one that should appeal to the average mechanic.

The vise is manufactured by the Oliver Machinery Company, Grand Rapids, Mich.

Klaxon Horn No. 16 is an electrical motor driven horn especially designed for use on the Cadillac car. The instrument is mounted on the cylinder block directly in back of the fan by means of two large cap screws. It sells at \$25 list in the United States—\$32 list in Canada, and is now standard equipment on the Cadillac 61. The design of the new Klaxon is interesting in many respects. The adjustment is made absolutely rigid by two adjustable lock nuts on either side of the motor. No amount of jarring will shake the parts loose. At the same time should wear have to be taken up after years of use, readjustment can be accomplished by a simple turn of the lock nuts.

The shaft of the motor armature revolves on ball bearings at both ends. The motor starts instantly when the current is turned on. Lubrication is needed rarely, a few drops of oil on the ball bearings



every 2000 miles being sufficient. The brushes are entirely self-lubricating and unusually long springs assure their even pressure on the commutator. The instrument can be cleaned with little trouble, as all vital parts are uncovered when the back shell is removed. The note of this new Klaxon is high pitched, powerful and unusually penetrating.

Manufactured by the Klaxon Company, Bloomfield Avenue and Grove Street, Newark, N. J.

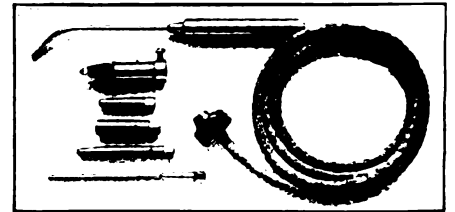
Torit Torch No. 13 uses acetylene only. This may be supplied from an old Presto-lite auto lighting tank. It is said to do all soldering, light brazing and heating jobs in a clean, inexpensive and safe way.

The outfit consists of a torch about 10 inches long, weighing only a few ounces, a set of four tips, one of which is made especially long and slim, for radiator work and lead burning, a soldering copper, which clamps over one of the tips,

five feet of rubber hose and a connection for the Presto or searchlight auto acetylene tank.

With the long tip one can work between the fins of a radiator and solder up a leaking tube without cutting the fins away. With the large tip it is possible to heat a two-pound soldering copper in about a minute or braze a steel bar three-quarters inch diameter, it is stated.

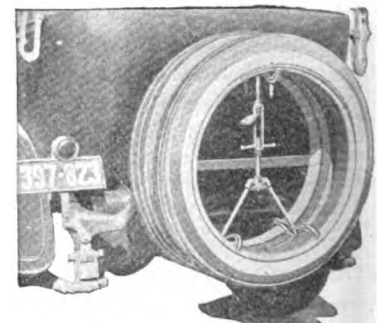
Every part of the Torit Acetylene Torch



is tested before it leaves our plant. It is in this way known that the entire set is perfect in every way, but should it be found at the end of 10 days from the time you receive the set that it is not satisfactory the maker asks that it be returned and the purchase price will be refunded or a new set sent.

Manufactured by St. Paul Welding & Manufacturing Company, St. Paul, Minn.

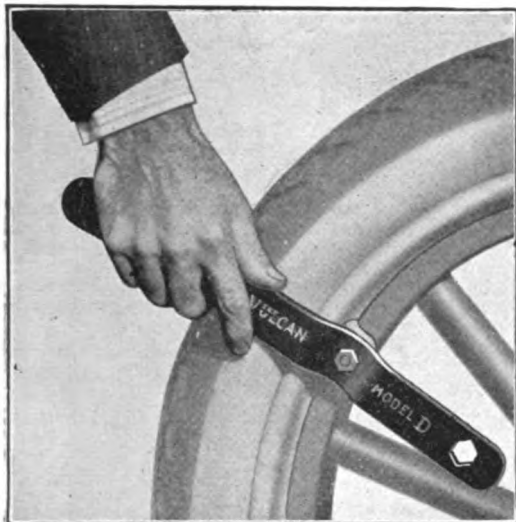
Markomi Duplex Tire Carrier is an auxiliary device, instantly applied to carry extra spare tires. It is made of the highest grade malleable casting and cold rolled steel, very light in weight, strong and rigid. It can be quickly applied and removed without the use of tools. All rims are fitted on this tire carrier and it may be transferred from one car to another in a short time. Pads are provided which



overlap both rims at three points, thus equalizing the pressure. The carrier prevents chafing of the tires by allowing a space between them, which also allows the use of tire covers on either or both tires. By inserting a pad lock in the hole provided the tires and carrier are protected against theft.

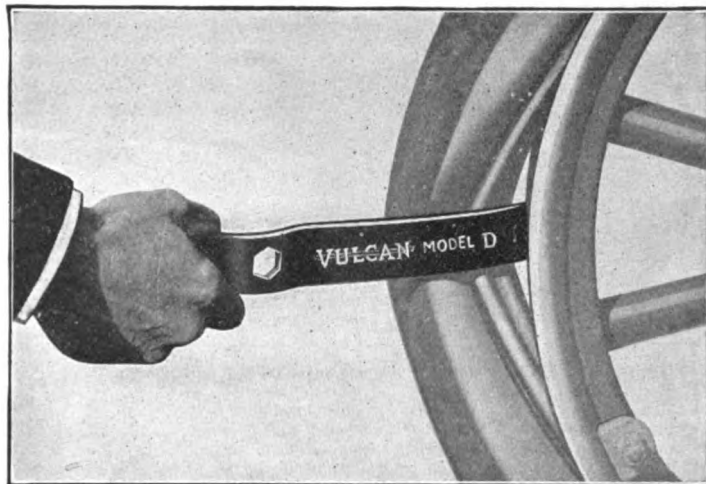
Manufactured by the Markomi Company, Incorporated, 7-11 West Dauson Avenue, Detroit, Mich.

(When Writing to Advertisers, Please Mention the MOTOR TRUCK.)



Vulcan Wrench and Tire Tool is made for handy all round use as a tire tool and rim wrench and with two size spanner holes to take care of the many rim nuts in

use from the Ford up. The tool is carefully oil tempered and heat treated. Rough surfaces are removed and it is finished in a bright steel finish with a coat of



durable, transparent rustproof lacquer. The tool is meeting with great favor and is practically indestructible, it is said.

Manufactured by Jenkins Vulcan Spring Company, Richmond, Ind.

Dunham Piston Ring Micrometer is made for use in piston ring factories and shops where cylinder regrinding or re-

1/1000 part of an inch. The ring is placed in opening at right. Indicator knob at left is revolved and steel tape tightens

switch and fuses.

The enclosing boxes are made in accordance with the latest practise and every detail has been worked out so as to insure the highest degree of safety, ease of installation or removal and convenient means of locking, it is stated.

Manufactured by the Roller-Smith Company, 233 Broadway, New York.



pairing is done. It is said this device measures instantly and accurately any piston ring or piston from 2 1/2 inches to 5 1/16 inches. Will measure 15 to 20 rings per minute, showing the size to

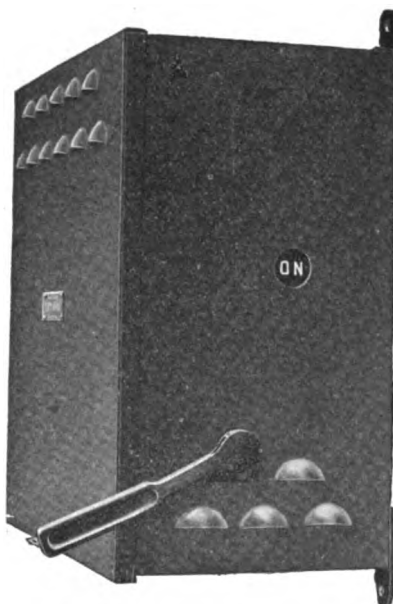
on ring, closing it. Indicator then points to size of ring on dial.

Manufactured by D. F. Dunham, 3941 Cumberland Avenue, Los Angeles, Cal.

Roller-Smith Enclosed Circuit Breakers Type E are made only in the double pole, independent arm type and are recommended particularly for two-wire circuits, A. C. and D. C. They are mounted in sub-

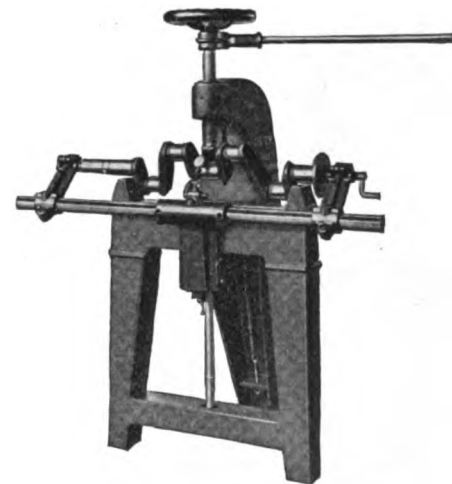


stantial steel boxes, through the front cover of which the two handles project, the position of the handles indicating whether the breaker is open or closed. In operation one pole is first closed and then



the other. If an overload or "short" exists the pole first closed will open as soon as the second pole is closed, thus making it possible to dispense with the usual knife

(When Writing to Advertisers, Please Mention the MOTOR TRUCK.)



and connected by a cable. It is equipped with an adjustable stop screw, giving a set up which permits the work to clear the blocks, thus eliminating lost motion. The hand wheel is graduated in 25 equal spaces and by turning the wheel 1/25 of a revolution you obtain an up and down movement of .0010 of an inch of the pressure screw. This press is equipped with a dial indicator which has a 1/4-inch stroke, and by placing the work between centers the amount the shaft is out of true can be read on the dial in thousandths.

Manufactured by the P. A. Geler Company, Cleveland, O.

Stix-On Wrench is a tool new in the principle upon which it works. "A sure

grip that can't slip" is the claim of the manufacturer. These tools are operated

price 35c each.

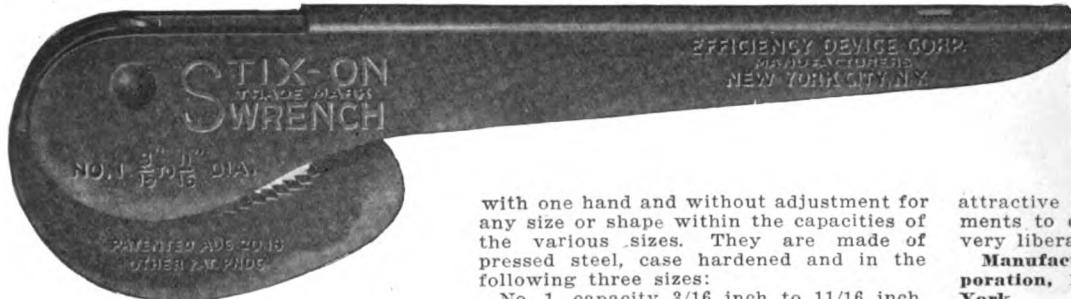
No. 2, capacity $\frac{1}{2}$ inch to $1\frac{1}{4}$ inches, price, 60c each.

No. 3, capacity one inch to $2\frac{1}{4}$ inches, price, \$2.40 each.

Sizes No. 1 and No. 2 are very popular sellers to the automobile household trade and hardware stores, as well as to accessory stores. The manufacturers furnish

attractive display cards with their shipments to dealers and their discounts are very liberal.

Manufactured by Efficiency Device Corporation, 173-177 Lafayette Street, New York.

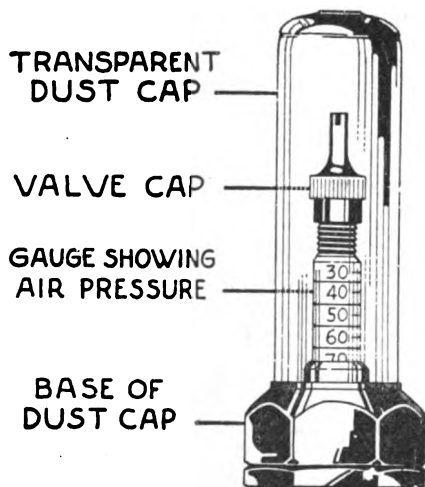


with one hand and without adjustment for any size or shape within the capacities of the various sizes. They are made of pressed steel, case hardened and in the following three sizes:

No. 1, capacity $\frac{3}{16}$ inch to $11/16$ inch,

Tirometer Valve is an appliance said to reduce the percentage of tire failures by eliminating improper inflation. The new device is attached direct to the tube and prevents the danger of being lost or not at hand when wanted. It is said the device has met with decided popularity among the motoring public. The advantages gained by being able to tell at all times the exact amount of air in the tubes, without the necessity of removing the valve cover or tube cap are many. The principle advantage is said to be in obtaining greater mileage from the tires. This is possible in no small degree by removing the human tendency for neglect, which is sure to insure on the units of the automobile if proper care necessitates the performing of a difficult, dirty and tiresome work.

The valve consists of a well made and sturdy valve stem through which passes an attractive nickel plated indicator, which is very accurately calibrated and graduated to show the correct pressure within the tube at all times, in pounds



per square inch. The tube is inflated in the usual manner by removing the valve cap, which is located at the top of the indicator, then the application of the air pressure causes the indicator to move upward until the proper pressure is indicated.

The valve is covered by an indestructible cap, it is stated, that is transparent as well as dust proof and permits the motorist to tell from a standing position the exact amount of air pressure in the tubes of his car at all times. The dust cap is made of a composition composed of glass and aluminum, which makes it clearly transparent, durable and unaffected by road ruts or flying stones, it is claimed. The valve is made to fit all sizes of standard tubes and is interchangeable with ordinary valve stems. The price is \$1.

Manufactured by Tirometer Valve Corporation of America, Charleston, W. Va.

Fyrac Spark Plug is designed to increase the firing area to which the compressed gases are subjected. It is stated



that the main feature of the plug rests in its ability to create a good intense and extra large spark within the engine cylinders at the proper moment. The size of this spark is said to provide approximately one inch of firing surface for the ignition of the gases, which aids materially in generating the full power of the engine, and also prevents the formation of carbon, by completely burning all the fuel within the cylinder at every explosion.

The material used in the manufacture of this plug is of the very best grade to give the motorist a long lived plug, it is stated, and each plug is ascertained to be in every manner a reliable product by the manufacturer.



"We have found during the past several months," says Mr. Hogland, president of the company, "that motorists on learning the superior advantages of one inch firing surface are buying them by the set. Dealers everywhere report a great many sales of Fyrac Spark Plugs in sets."

Manufactured by the Fyrac Manufacturing Company, Rockford, Ill.

(When Writing to Advertisers, Please Mention the MOTOR TRUCK.)

Apco Wheel Puller exerts the pulling effort on two opposite spokes of the wheel instead of on the threads of the hub. This decreases the time of application and al-



lows an easier adjustment of the puller screw. A pointed bolt exerts the pushing effort against the end of the axle shaft.

Manufactured by the Apco Manufacturing Company, Providence, R. I.

Everhot Soldering Iron and Blow Torches do good work where a standard blow torch is desired, it is said. The Everhot one quart standard blow-torch presents exclusive features. A pre-heating chamber acts as a carburetor, which gasifies the fuel with a completeness not frequently approached. A pure dry gas is produced, which makes a hotter flame, while using less fuel. The self-cleaning needle valve is an assurance against clogging at all times. This valve cannot be enlarged, or in any way injured by screwing in the needle too tightly it is claimed.

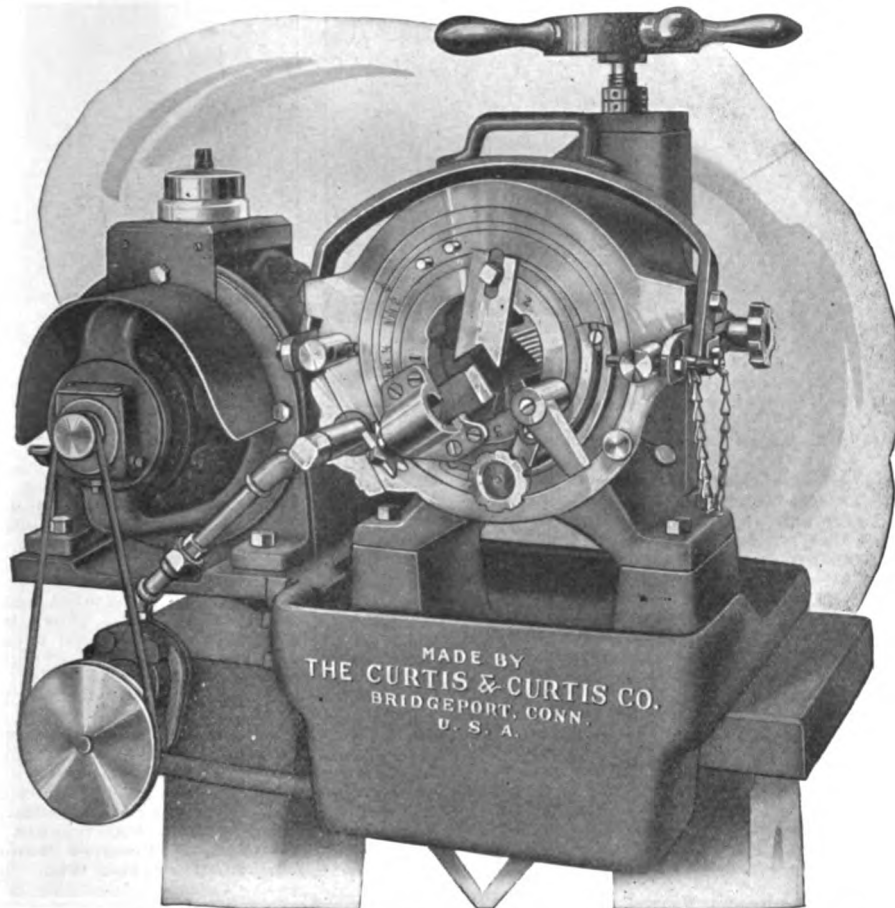


The Everhot pump stand prevents the straining of any connections as it is not necessary to hold the barrel when using pump.

Manufactured by Everhot Manufacturing Company, Maywood, Ill.

Forbes Portable Threading Machine is a small self-contained machine, which is suited to the needs of automobile manufacturers and garage men. It threads and cuts off pipe from $\frac{1}{4}$ to two inches (nominal sizes) and bolts from $\frac{1}{2}$ to two inches in diameter. It may be readily moved to

and lock is attached to the die head, which locks the dies in position during threading and automatically unlocks and opens them at the completion of the thread. The dies may be instantaneously reset by a turn of a lever, and when working on a certain size all threads will



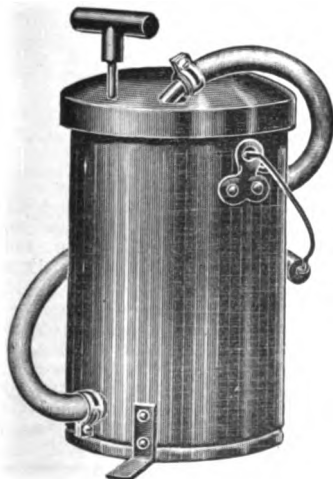
the job and its one horsepower motor connected to the nearest electric light socket. With it two-inch pipe may be threaded in less than one-half a minute and smaller sizes proportionately faster, it is stated.

The machine has an automatic lubricating system, requiring no attention on the part of the operator. A die release

is identical, both as regards length of thread and diameter. The cutting off device is automatic in its feed and simple in design. It cuts off square and leaves no burr. High speed steel cut-off tools are furnished as regular equipment.

Manufactured by the Curtis & Curtis Company, corner Railroad Avenue and Garden Street, Bridgeport, Conn.

Ideal Grease Cabinet and Pump will force all oil and grease that will sink down in the container and around the pump barrel to the point where needed. The large cover makes it very handy to fill the container, using a scoop or dipper. It is clean and convenient to carry with the nozzle put through the hole in the cover. It is claimed to measure, funnel



and protect the oil from dust and water. It eliminates the possibility of the dripping which would mix with dust and drain back into the tank, or mar its appearance. There is no need of putting the measuring can on the curb or running board while lifting the hood, as it may be kept in the cabinet.

With this appliance it is not necessary to leave the bulk of stock open for any one to use. The dispenser may be filled at intervals and a ready check is available at all times, by using the measuring rod. The frame is of steel angles, mounted on two 10-inch disc wheels, and arranged so the stability is sufficient to prevent any accidental overturning, and yet the device is very portable. The handles are collapsible. A cabinet 11 inches high of 20 gauge steel gives protection for measures and funnels. The steel sign boards on the spout cover afford excellent advertising space. Interchangeable plates showing grade of oil can be fastened to the cover above the spouts.

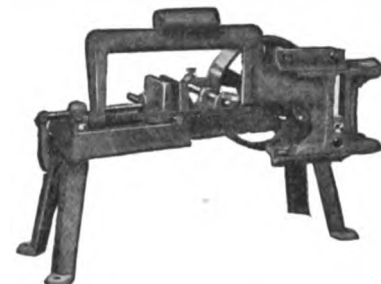
The painting of frame, cabinet and sign board is in black, the drums in red with lettering and striping in yellow. In quantity lots the color of the drums and the lettering will be made to the buyer's order.

Manufactured by the Midway Mechanical Company, 1555 Selby Avenue, St. Paul, Minn.

(When Writing to Advertisers, Please Mention the MOTOR TRUCK.)

Manley Power Hack Saw is a machine especially adapted for use in the garage or repair shop, it is said. The machine is very substantially constructed and designed in such a way that there is practically no jerky mechanical movement.

The mechanism which gives the machine its reciprocating motion is nicely balanced so that the pressure on the saw is discontinued on the return stroke, it is asserted. The placing of an adjustable weight on the top of the saw blade frame allows the operator to vary the amount of pressure bearing on the saw when in operation. The vise of the machine is

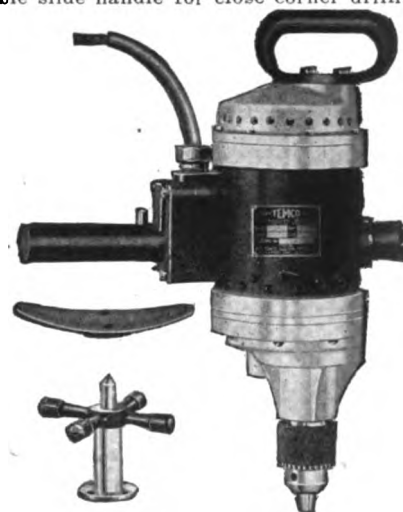


carefully machined and insures the cut made by the saw being at exact right angles to the jaws of the vise. It is operated by a sturdy adjustable clamping screw, which will stand a great amount of leverage without any danger of stripping or tilting. This vise will readily accommodate work of four by four inches, which makes the machine capable of handling many of the garage jobs without trouble.

It is manufactured of the best grade material and all parts are finished to accurate dimensions, it is stated. Holes are provided through which bolts may pass and the saw made fast to the floor of the shop.

Manufactured by Manley Manufacturing Company, York, Pa.

Temco Model "K" Hard Service Drill is a compact and powerful drill highly recommended to all factories, mills and shops for rapid and accurate production drilling, and to garages and service stations for repair work of all kinds. It has a Universal motor mounted on high grade ball bearings. A quick break switch is mounted at the side of motor frame right where you need it for easy control at all times. Off-set chuck spindle and detachable slide handle for close corner drilling.



Regular equipment consists of $\frac{1}{2}$ -inch capacity Jacobs' chuck, two-side handles, screw feed, breast plate, grip handle, 15 feet of cable and plug. Length with chuck and grip handle, 17 inches. Speed running idle, 600 revolutions per minute. Net weight, 22 pounds. Shipping weight, 35 pounds. The price with regular equipment is \$92.

Manufactured by the Temco Electric Motor Company, Leipsic, O.



Waltham Model O Truck Clock is built to keep accurate time, despite climatic changes and the shocks of travel over rough roads, it is said.

It is jeweled and has two main springs. The radium dial and hands are plainly



visible on the darkest night. It is necessary to wind it only once in eight days, and it can be supplied with a winding indicator, a red signal on the dial.

The motor truck can be made a much more efficient factor in transportation by equipping it with a modern and reliable timepiece.

Manufactured by the Waltham Watch Company, Waltham, Mass.

Copperhead Service Wrench No. 4100 combines one wrench into four instantly accessible sockets, one for any standard



rim bolt made. It is not necessary to hunt for the socket needed for the four sockets are right on the wrench. They stay on making it impossible to misplace

(When Writing to Advertisers, Please Mention the MOTOR TRUCK.)

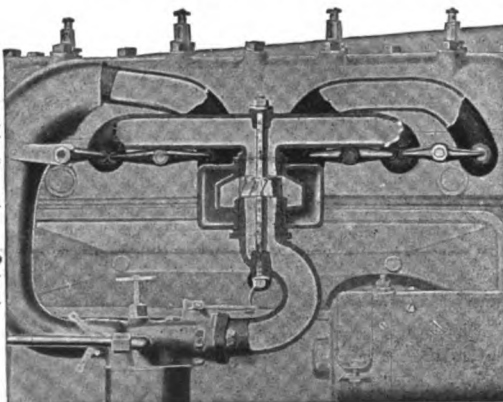
them or lose them. It is said to save time, trouble and temper as well as its cost over and over in any garage or service station. A twist gives you the socket you want, in place and ready for use. Then a slight pressure under the socket releases the locking device, permitting turning the spider to the required socket (all one motion) and the spider is automatically locked, the harder the resistance the harder it holds.

This wrench with its 18-inch length and easy rolling hand grip gives ample leverage for any ordinary rim bolt job. In stubborn cases, where the bolt is rusted in or for final tightening, the leverage can be instantly increased 300 per cent. by turning the wrench handle at right angles to the socket.

Manufactured by F. R. Lueck Manufacturing Company, Milwaukee, Wis.

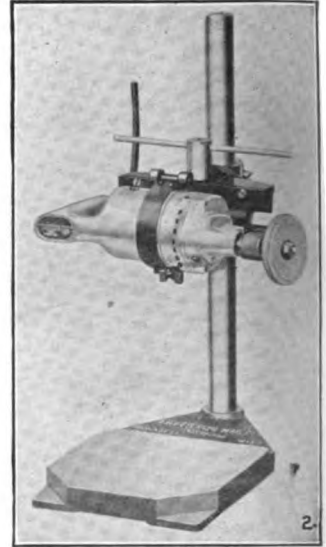
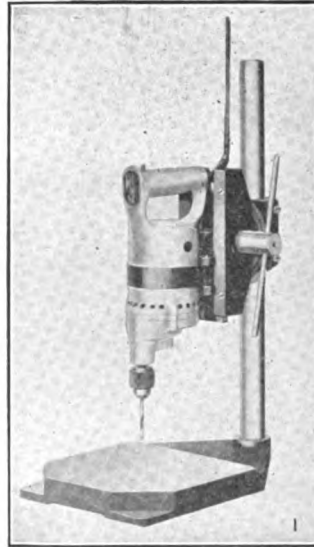
Sargent Gasformer is a device said to be giving decidedly good results on all engines to which it has been applied.

When the device is in operation the air rushing to the engine to fill the cylinders



passes from the carburetor to the manifold and striking the 12 blades of the fan, cause it to revolve at a high speed, thoroughly mixing the air and gas. As the air flows through the carburetor at a high velocity it gasifies the lighter fuel and carries along towards the cylinder, in a liquid form, particles of heavier fuel which ordinarily flow into the combustion chamber, but in the Gasformer these are caught by the fan blades and separated from the gas current.

The construction of the fan is such that



The Hole Shooter is an electric portable drill that can be adapted to many other uses in addition to the drilling of holes. The maker of this tool has developed a number of unusual attachments which make it a whole machine shop of usefulness, it is said.

Among these inventions is a radial portable drill press stand, as illustrated here, remarkable for its simplicity. Other inventions include a battery terminal opener, end bristle wire brushes of various grades and sizes which are mighty useful in removing carbon from cylinder heads, burnishing work, removing paint and varnish, a commutator saw wheel on a flexible shaft, rotary taper files, special emery grinding wheels, special buffers, which are used to excellent advantage in simonizing bodies as well as for ordinary buffing work, and many other attachments.

Manufactured by A. H. Petersen Manufacturing Company, Milwaukee, Wis.

the gas flowing through must change its direction about 30 degrees; therefore any particles heavier than the same volume of air, such as liquid fuel, road dust, or dirt, being more inert, are deposited on the fan blades, from which, by attrition, they are delivered to the gutter in the leaving edge.

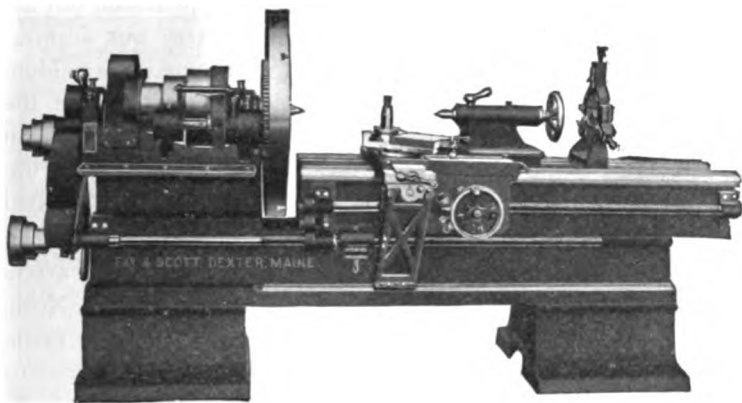
On account of the high speed of the fan any liquid or dirt flowing into the gutter or to the inside of the housing is thrown through the holes by centrifugal force. The inside flange on the leaving edge of the housing prevents any fuel on its inner surface from passing fan between the gutters.

The liquid particles strike the hot walls surrounded by the hot gases, and if not gasified, at once run down over the hot inclined surface to the bottom of the chamber, where, in time they will gasify, and as pressure is generated will flow back into the gas current from whence they came in a liquid form.

As there is only a slight drop in pressure (less than one-quarter inch of mercury), the fan floats in the gas stream, and, without any more lubrication than is obtained from the fuel itself, will last as long as the car to which the device is attached. The insulating bushings prevent heat from reaching gas stream, thereby keeping the intake only sufficiently warm to prevent recondensation.

The claims of increased efficiency and economy by the use of this device, which are made by the distributor, seem to be well substantiated by the testimonials received. It is said that the saving effected by the appliance will pay for it in a short time.

Distributed by Cornelius H. Van Dervoort, Moline, Ill.



Fay & Scott Extension Gap Lathe is designed to meet the demand for a tool capable of turning work of large diameter and extra length, as well as doing work accurately and well within its ordinary capacity.

These lathes have ample power and strength to turn full diameter of swing in the gap, at the same time being free from any awkward or objectionable features for use on ordinary work.

By sliding the top bed the gap can be varied to suit the requirements of the work. This extension of the bed is an important feature, inasmuch as it not only increases the swing of the lathe, but also increases the distance between centers for turning long work.

It is claimed the advantages of this type of lathe over the ordinary gap lathe or the double spindle lathe should be fully appreciated by the careful buyer who investigates the merits of each.

Manufactured by **Fay & Scott, Dexter, Me.**

Nick-Rode Timer is especially designed for Ford cars. In this timer for Fords reduction of speed has been obtained in the rotor by using a small diameter race-way of unusual width. This is a decided advantage it is claimed, as it aids in eliminating arcing at the contacts and also reduces the wearing of the contact surfaces. Another feature is that the race-way is practically continuous, being part of the bronze timer case.

The bronze timer case is provided with four equidistant cast-in grooves. Into these grooves the copper contacts are fitted, being insulated from the case at the bottom by a fabric strip and at the top by the air gap, which is secured by mak-



ing the width of the contact approximately $\frac{1}{4}$ inch less than the width of the timer case grooves.

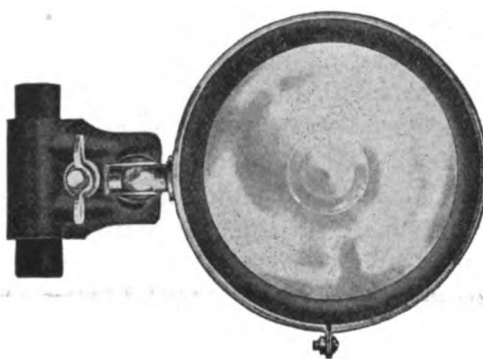
The threaded extensions on the contact

points are equipped with the usual type of terminal and are insulated from the case at the outside by a suitable fiber washer. The rotor assembly is of cast bronze, while the rotor element also is of bronze. The retail price of the device is \$2.

Manufactured by the **Thomas Nickell Company, Richmond, Ind.**

Rofly Spot-Light is a highly powered and perfected driving light, with a mirror glass reflector of the return ray type that minimizes the glare, states its manufacturer. It is finished in such manner that it will not rust, corrode, tarnish or in any way deteriorate.

This light is easily attached to the car by the average person and requires no



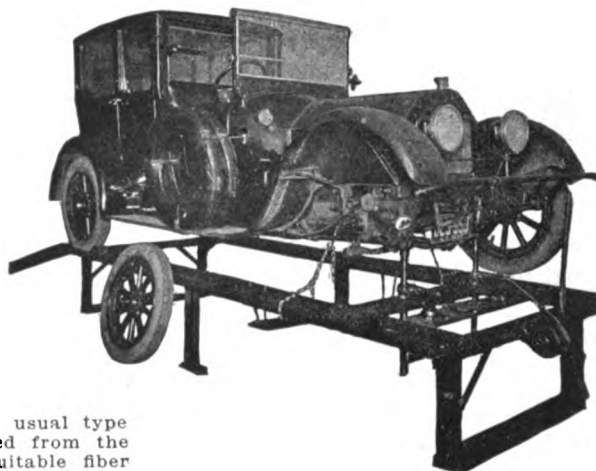
extra appliances besides those furnished by the manufacturer. The light handle is manufactured from a good grade of malleable steel. Provision has been made for a wide radius of operation with the light by installing a 360 degree ball and socket universal joint. This allows the light to be directed in practically any direction at the will of the driver. All bearings, upon which the proper operation of the light depends, are made of a good grade brass, as this metal is practically rust-proof, and, under the intermittent action to which a spotlight is subjected, will last indefinitely with out excessive wear. The clamping device, which is depended to support the light rigidly at all times, has been constructed of cold rolled steel, a coating of japan being applied after machining and thoroughly baked on.

For bulbs, the light uses a 27 candle power with frosted tips and, it is said, the beam of light thrown by this spot-light closely resembles in appearance that of a finely adjusted search light of small power.

The body construction of the light is finished in black enamel, which is baked on. The trimmings are heavily nicked. This combination finish produces an appearance which adds to the beauty of any car.

Manufactured by the **Standard Corporation, Columbus, O.**

The **Auto Table** is a one-man auto repair device absolutely reliable, safe and strong.



The remarkable ingenuity in design and construction places it within the reach of the private owner, the wayside shop, the service station and the mammoth erecting or assembling plant, it is claimed.

The automobile is securely clamped to the auto table with strong adjusting hooks and chains. In this position it is ready to have any underside work done.

In case of a dead engine, an auto can be pulled up the skidway, on to the auto table in a few minutes with the powerful hoist drum, equipped with gravity engaging pawls, or it can be quickly lowered down with the powerful brake.

A seat is provided which may be placed at any point under the car and adjusted to different heights. The mechanic's seat permits all underside mechanical operations to be made quickly, accurately and efficiently.

The uses of the auto table are unlimited, such jobs as relining brakes, brake tension adjustments, taking up engine bearings, tightening up shackle bolts, aligning, greasing, acetylene welding, washing, cleaning and painting are easily done. The clutch, gears, universals, wheels, axles, springs and differential may be removed or repaired at a work shop bench height.

The auto table is of all steel construction, combining greatest possible strength with the least possible weight.

Manufactured by the **Auto Table Company, 120th Street and Jamaica Avenue, Richmond Hill, N. Y.**

Autoquip Valve Grinder is said to make the grinding of motor valves extremely simple and easy. It is not at all necessary to employ the services of a skilled mechanic to operate the device as the only necessary motion is turning of the crank. The mechanical movement by which the device is operated is provided by a plain rack and gear, which prevents sudden jerks or jars while the operation is being performed.

The device is said to be meeting with decided approval among both private owners and repairmen, many of whom praise the appliance highly. It is well constructed and designed to stand up under the most strenuous duties of valve grinding, it is stated.

The finish is of black enamel and nickel adds to the attractiveness of the finished product. Additional bits are also provided which are made in different forms to engage the various types of valves. The price is \$5.

Manufactured by the **Autoquip Manufacturing Company, Incorporated, Rochester, N. Y.**



(When Writing to Advertisers, Please Mention the MOTOR TRUCK.)

(Continued from Page 423.)

now supplement centralized transportation with an individual medium, subject entirely to your own whim, preference or need.

This is a great economic development.

It is potent now and destined to be still more so.

We presume to discuss this subject with you only because we are in close touch with the development.

The whole problem and its various ramifications is rendered much more complex by the increasing intricacies of the relationships of urban life and rural life. It is hard to separate their interests.

I believe even if a legislative body had the deliberate intent to discriminate that it would be hard to work out a plan of taxation which would unfailingly injure one group and leave the other groups unharmed.

Farmer Paying "Luxury" Taxes.

I should like to give you an instance.

In all of the last three revenue laws there was a deliberate purpose to put the heavier tax on what were termed "luxuries."

The war made this a popular policy.

Among other items Congress taxed long distance telephone calls, amusements, moving pictures, automobiles and automobile repair parts.

In some sections this basis was very popular.

Among all those who voted for the two Kitchen bills and the present law, none has been willing to admit that he had any animus against the farmer.

All would have spoken up vigorously and properly said, that the farmer was the bulwark of the nation, and that upon our ability to keep him happy on the farm and profitably producing depends in large measure the future of the country.

Yet in actual practise the taxes on the items I have mentioned all struck at the very things that have contributed to make more tolerable the life of the farmer and his family.

These taxes were all taxes against

TRUCK SHIPMENTS OF STRAWBERRIES BRING BETTER PRICES.

FARMERS 150 miles distant from Detroit are bringing in their strawberries by trucks. Strawberry shipments into the Pittsburgh, Ore., market are also being made by truck. Growers and commission men generally report that the berries arrive in better condition and bring better prices when shipped by truck.

the farmer.

The telephone ends his isolation. The phonograph makes it possible to bring the master works of music to his home and make that home more entertaining to his children. The moving picture was one of his sources of education and diversion. The automobile was the basis of his contact with the outside world and the medium of transportation.

As owner of one-third of the automobiles in the United States he suffered more through the parts taxes than any other one class.

Do not forget that when the farmer's automobile drops into a chuck hole and breaks an axle it is bad news for himself and his family. Even his neighbors regret it. But the United States government is no "good samaritan," for back of the barn lurks the tax collector waiting for his five per cent. on the replacement axle.

All this shows that taxation is intricate, that nothing should be left to chance, and that every possible effect should be accurately reasoned out.

In studying transportation we quickly discover that it influences every phase of our existence.

Transportation Slow to Develop.

As a background, I should like to draw you a rapid picture of transportation development.

We, in this country, are great admirers of the pioneer.

We revere a Columbus or a Magellan. We thrill at the courage of

the Lewis-Clarke expedition, but actually we do not carry our admiration far enough, because we seldom consider how inadequate were the mediums of transportation with which these men ventured over uncharted oceans or penetrated fathomless forests.

I should like to direct your attention to a startling thought. Nothing in the world has been so slothful in its development as transportation.

Ninety per cent. of all the years that have elapsed since the birth of Christ saw in use the same primitive mediums of transportation that prevailed during his life time.

In 1800 years the world has not advanced beyond the point of the man-hauled or the beast-hauled wagon or cart, or the man-propelled or wind-propelled boat.

It is an amazing thought when set against all that happened in the world in that time.

The culture of Greece, the far-flung power of Rome, the mighty empire of Charlemagne, all had their rise, their history and their fall.

The dark ages and the middle ages came and went.

In the 15th and 16th centuries came that great outburst of exploration that carried the mariners of Europe all over the world to the discovery of new countries.

Three great revolutions, in England in 1688, in our country in 1776, and in France in 1792, made their contributions to free institutions.

Yet during all that long period the world still clung to that same kind of transportation that the disciples of Christ knew.

In other directions marvelous advances were made.

Progress in Other Directions.

If the world was slow in transportation it was not slow in the fundamentals of government.

The Magna Charta, the great basis of all civil liberty, antedates the coming of a new kind of transportation by six centuries.

The Declaration of Rights in England, and the Declaration of Independence in the United States also antedate any transportation ad-

vance.

Inventors achieved both for good and ill.

They discovered gunpowder. They invented printing. They did nothing for transportation.

The great art works of all times, paintings, statues, buildings, mountain peaks of human genius, all came to the world while transportation still depended upon the wind and upon the muscles of man and beast.

Actually the history of modern transportation can be written within the last 120 years.

The world has accomplished more in that interval than in 1800 years of prior Christian history.

When Robert Fulton launched the Clermont on the Hudson, and when Stephenson two decades later invented the steam locomotive, they discounted everything that had gone before in the entire history of transportation.

Now, at the beginning of the 20th century, we have also motor vehicle and aeroplane, depending upon internal combustion motors, gasoline driven, just as their predecessors depended upon steam and electricity.

The aeroplane has not yet been perfected to the point of great commercial development, but the motor vehicle has gone so far that the President of the United States, in his first message, called attention to its dominating place in our political, social and industrial life.

I should like to illustrate by figures relating to 1918, just how freight and passenger haulage is divided in our country among the various mediums.

I have chosen 1918 because these are the most representative figures I have been able to obtain.

In that year 18,000 miles of inter-urban trolleys moved 4,000,000 tons of freight.

Over the Great Lakes and Mississippi, 15,000 miles of waterways, went 90,000,000 tons.

Steam railways, over 259,000 miles of trackage, moved 2,504,000,000 tons.

The motor truck, the baby of the quartet, carried 1,200,000,000 tons, a

figure to some extent an estimate, but a conservative estimate.

We do not think we can take the place of the steam railway in long distance hauls. We do not think we can move freight as cheaply as the waterways. We concede cheerfully the function of other mediums, but we do insist that our place be equally recognized.

Place of Electric Trolley.

In respect to passenger transportation, the electric trolley has a dominating place in the hauling of urban passengers.

Electric trolley traffic amounts yearly to 13,000,000,000 paid passengers and 3,000,000,000 transfer passengers.

It is a remarkable fact that in spite of the increasing use of automobiles the number of trolley rides per person is also increasing.

The trolleys carry 13 times as many passengers per year as the steam railways, the latter figure being 1,066,000,000.

The automobile figures must, to some extent, be estimated, but allowing for 10,000,000 cars, used daily, on the average, by two and one-half persons, we get a result of 25,000,000 automobile riders daily, or approximately one-fourth of the population.

Even this last statement does not thoroughly show the picture. It does not show how widespread is the use of the automobile.

It is a popular fallacy to look at the traffic congestion in city centers and think of the automobile as a city convenience.

Actually, the city is a comparatively small user of automobiles.

Seventy-two per cent. of all the cars in this country are in points of 50,000 population or less. Fifty-two per cent. are in points of 5000 population or less. Thirty-three and one-third per cent. are in villages and hamlets of 1000 or less.

Two-thirds of all the automobiles go into homes whose income is \$4000 yearly or less.

Our estimates indicate that 60 per cent. of all the use of passenger automobiles is a utility one, and that for some automobiles this figure

mounts as high as 90 per cent.

The influence of motor vehicle transportation on the movement of the necessities of life, food, fuel, raw material and manufactured articles, is of increasing importance.

The farm figures alone constitute impressive figures.

Senator Capper says that the farms of the United States, together with their equipment, represent an investment of \$70,000,000,000. The Department of Agriculture has estimated that 134,400,000 tons of farm produce go over our highways yearly.

Fuel is largely dependent upon motor vehicle transportation. More and more coal and oil, especially in retail distribution, are handled through motor trucks. Electric companies, to keep up their lines, are heavy users of trucks.

Raw material, the ore from the mines, the lumber from the forests, the gravel from the pit, the cotton from the fields, are all largely transported by motor truck.

To attempt to give a list of the manufactured articles that go to our public via motor trucks would prolong this article past all bounds.

Suggestions as to Help.

I have briefly sketched our place in the picture. I know that you stand ready to help.

I should like to make a few suggestions.

I do not apologize for presenting the case of the automobile in a highways talk, for I do not believe you can separate them.

It is just as futile to think of the highways as dissociated from the motor vehicle as it would be to think of the steam railway without railroad tracks.

I have always argued that any tax on any kind of transportation is a hardship to our people and reflects itself in increased costs.

We have managed to make many people agree with us that the tax on steam transportation should be removed, but we have not been so successful with respect to taxes on motor vehicle transportation.

We still are worrying along under excise taxes, which we have pre-

ferred to know as "stigma" taxes. "Stigma" taxes are not new. They antedate the war. Before the war we had them on alcoholic liquors, narcotics, murderous weapons and to some extent on tobacco.

The excuse for high taxation on such articles was that they are not essential to the public welfare, in many cases actually harmful. Hence it was considered well advised to tax them heavily, not only that they might be sources of revenue, but to curtail their use.

The exigencies of the war very unjustly thrust into this classification jewelry, musical instruments, cosmetics, automobiles and a variety of other useful articles.

We protested, but were assured that we must bow in the interests of revenue.

We believe now that these taxes should properly be eliminated, since they put an unjust reflection on lines of business that serve the public.

This we believe to be particularly true in our own case.

Motor vehicles are already heavily taxed.

It is thought by foremost members of the House and Senate that the tax on automobiles, motor trucks and other repair parts should be eliminated.

In the debate on the bill some foremost members took this position.

The new chairman of the Senate finance committee, Senator McCumber of North Dakota, contended that the tax on motor trucks was especially ill advised.

We believe that within a short time continued public agitation of this subject will bring legislators to our viewpoint on motor vehicle transportation.

Already Heavily Taxed.

We concede that we should pay our share toward road maintenance. Our present registration and license fees, excise taxes and other special levies raise more money than is needed to pay the total road maintenance bill for the entire country.

Beyond that we should not be called to go.

We think that it is the duty of us all as progressive citizens to fight for continued highway appropriations. Wonderful things have already been accomplished in that direction.

It is but 30 years since the movement was inaugurated when Congress voted \$10,000 for highways investigation.

This sum has grown until this year there are available in state and federal appropriations \$720,000,000.

Mr. Jordan, in his address at Lexington, Ky., pointed out that the people of this country will no longer bear the extravagance of bad roads.

Many have contributed to this work. The American Automobile Association, especially through the lamented Batchelder helped splendidly.

We feel some pride in the work of our own organization, and particularly as directed by our highways chairman, Mr. Chapin. His colleagues, Messrs. Brosseau, Jordan, Reeves and Johnson, have also aided powerfully.

Two figures loom strongly in Washington.

There never should be a good roads meeting where a word of tribute is not paid to the courageous and unselfish service of Senator Townsend, and of the chief of the bureau of roads, Mr. McDonald.

Chief McDonald has often held views differing from those of the automobile industry, but we believe that he is the biggest man who ever held the place, and that the work he is doing makes him one of the most useful citizens in American public life.

We are glad as an industry and as an organization to put our full power and resources back of any program he stipulates.

Our work must also include the education of transportation economists and highways builders able to carry on this work.

I am glad to say that many foremost schools and colleges are co-operating powerfully to this end.

A Word About Safety.

We must work also so that the highways may be made safe both for the pedestrian and other vehi-

cles, motor or horse.

The automobile, a great instrument of service to the public, must not be permitted to become a menace.

We must train the children so that the danger margin may constantly be decreased.

I have much hope that this can be done.

I do not see why we cannot educate intelligent human beings when it has been possible to inculcate caution in the mind of the American chicken.

I note a great improvement in the chicken attitude, and by chicken I do not mean the one that often rides in the car, but I rather refer to the unfortunate that used, so often, to be found under the car. She is learning. I distinguish as to sex because I think that most of the mortality among fowls involves the feminine of the species.

When riding across country, with the dominant half of my family, it has always been my delight to emphasize the stupidity of the hen. While the rooster, fortified by his masculine poise and superior brain power, stood sensibly by and watched the automobile pass, it was always the flurried hen who crossed and recrossed four or five times until the tragedy was at last enacted.

But the hen is progressing. Now she shows almost as much sense as the rooster.

Evidently generations of chicken automobile tragedy have demonstrated the need of caution. Hens are all learning that it is wisdom to stay on their own side of the road and give the rushing machine its full right of way.

If we could do that with hens, and despite their limited mental modicum, why not with children?

It is simply a case of driving home the message.

What I have thus rapidly sketched presents our theme and opens this article.

I have dealt with only those principal points that we regard as fundamental.

What the Highways Are.

In concluding, I should like to summon your imagination that you may think of the highways for what they are, and not simply as winding ribbons between farm land, or as merely graded surfaces of clay, gravel, asphalt, macadam and concrete.

Let your imagination carry you further and see the highway in relation to the task it performs.

The highway is not simply a road.

It is not simply a surface.

It is assurance of the civilizing influence of better communication between sections. It is silent but persistent factor for the reduction of living costs. It is an humble but powerful foe of ignorance, since it is usually the route to education. It is the safeguard of your food supply. It is the guarantee to the public

AUTO AND TRUCK SHOW AT WORCESTER.

The Worcester Agricultural Society will hold an automobile and truck show at the New England fair, Worcester, Mass., Sept. 2, 3, 4, 5 and 6, in the same building which the show has been held in previous years.

The building has cement floor 150 feet wide and 130 feet deep, truss roof and is well lighted. Spaces for passenger cars measure 17½ feet by 9¼ feet.

Nineteen hundred and twenty-one exhibitors in the passenger car building will have the privilege of re-engaging their space for this season. The management will furnish necessary four-day complimentary tickets, season auto tickets for the demonstrating car and various other accommodations and conveniences.

The directors have already received many applications for space and if you desire them to reserve space for you send your check in at once. The spaces are \$25 each. No reservations will be made unless accompanied by check.

The truck show will be held in the large tent immediately adjoining the passenger car show building.

against the prostrating influences of industrial upheaval and interruption to distribution therefrom. It is the popular open air theater of enjoyment for the family. It is the connecting link between the home and the factory, the city and the farm as well.

It is real estate insurance. It is the text book of nature to our millions of people. It is the call to the open air, the physician who makes no charge for his services.

To serve where the results are so far-reaching should be a welcome call.

Rich and poor, high and low, farmer and city resident, citizens of North, East, South and West, all should stand ready, since to define the proposition in a sentence, the cause of the highways is everybody's business, because it is everybody's benefit.

WOULD RECOVER LOST TRADE

B RITISH motor manufacturers are now giving serious thought to the possibilities of recovering some of their lost foreign trade, according to information received from the Department of Commerce, London, representative. Although it is recognized that the high costs of production, with consequent high selling prices, along with the vagaries of exchange, will prove a great drawback, the manufacturers are determined to effect economies in some way

in order to reduce prices so that they will be more nearly competitive with foreign makes. Much depends upon the attitude of labor—whether or not the workers will assist by accepting reductions in wages, adjustment of the war bonus, and what is called a more reasonable attitude on the part of trade union leaders toward the manufacturers. It is necessary that labor cooperate in order that manufacturers may make some definite plans for the future.

E VERY endeavor is being made by manufacturers to pick up the loose ends and increase production since the settlement of the engineering dispute. Signs of activity are becoming more apparent in most departments of the trade. Business in the heavier models is still slack, but the demand for light cars of eight to 11-horsepower, of the more popular models, is satisfactory. The output of these cars will be considerable as soon as complete balance is restored in the shops.

Truck Hire Cheaper Than Coolie Labor.

Small Chinese firms have found it cheaper and more efficient to hire a truck than to employ the necessary number of coolies, says Consul General Edwin S. Cunningham, Shanghai, in a report to the Department of Commerce. A Shanghai newspaper has estimated that the expense of operating one truck for a day would be about \$31. To do the same amount of work 60 coolies would be required at a cost of from \$36 to \$48 for labor alone, exclusive of all other expenses.

Spanish Automotive Imports Increasing.

The Automotive Division of the De-

partment of Commerce reports that in keeping with incoming reports that motor sales have been very good in Spain, that country imported 239 passenger cars and 62 trucks from the United States during June, as compared with 141 passenger cars and three trucks during the previous month.

Japan Takes Fewer American Automobiles.

Reports that European cars are gaining in popularity in the Japanese market, owing to their low fuel consumption and low horsepower, seem to be verified by the decrease in exports to that country from the United States during June, according to Department of Commerce figures. Exports of American passenger cars to Japan dropped to 10, valued at \$13,178, as compared with 176 in May and 116 in April. Truck exports dropped from 128 to 86.

Motor Vehicles on Angolan Budget.

The Angola budget for the fiscal year 1922-23 carries an item of 800,000,000 escudos (about \$56,000 at present rate of exchange) for the acquisition of passenger cars, motor trucks and motorcycles. Light types will undoubtedly be desired

as the roads of Angola are such that trucks weighing more than 5000 pounds when loaded experience difficulty in operating outside of the towns and also damage the roads which are not macadamized. American trucks are well liked in Angola.

China—Large Stocks of Automobiles on Hand.

Manufacturers of motor vehicles who are desirous of entering the Chinese market should not do so within the next six months, advises Trade Commissioner Hoyt in dispatches to the Department of Commerce. The stocks of dealers, who usually handle two or three makes, are large at the present time and are being disposed of slowly. However, the good roads movement inaugurated in 1921 is spreading over a great part of the country and the market in China will bear watching, he states.

American Assembling Plant in Denmark to Be Enlarged.

A large American automobile manufacturing concern has purchased a tract of land from the city of Copenhagen in order to enlarge its assembling plant in that city.

The Folberth Automatic Windshield Cleaner

(By S. G. SWIFT.)

WHO among our many readers would ever guess that the highly efficient Folberth Automatic Windshield Cleaner used today by thousands of motorists and installed as standard equipment by manufacturers of fine cars owes its existence to a linen handkerchief tied onto a stick?

Strange you say! And yet not so strange; the steel plow with its clean cutting point and smoothly working mould board was once a pointed stick in the hands of a half-clad savage; the luxurious, easy riding sedan is the

evolution of a rude chair carried on long poles by perspiring coolies; the towering fireproof building of cement the modern conception of the mud-hut of the ancients, and the telephone the present day signal fire of the early inhabitants of America—if one may be allowed to indulge in a bit of metaphor. So there's nothing unusual in the inception of the Folberth Windshield Cleaner after all since every so-called invention in reality is but the development of a fundamental idea or principle long established.

TO PROPERLY understand matters we must go back several years—17 to be exact—and in a manner of speaking take part in one of the Glidden tours, those world famed runs which so severely tried the stamina of the best cars produced in this country. These tours, familiar to our older readers, were held regardless of weather and road conditions and in every sense were the most severe competitive tests for automobiles ever held in the United States.

Fred Folberth, who with his brother, William Folberth, has been prominently identified with the automotive industry for many years, was an enthusiastic Glidden "fan," and took part in many of the runs. Nothing pleased him better than the chance to pit his wits against other drivers and according to those who knew him the worse the road conditions were the better he was satisfied.

The last tour in which he took part was held in weather that was a long way from ideal. It rained continually throughout the trip, roads were little better than swamps and there was hardly a foot of the highways that did not need constant watching by the driver to prevent the car getting mired.

It was raw and cold, clothing was soon wet through by the drizzle and the windshield throughout the entire journey was constantly in need of wiping if the driver was to see where he was going. It was at this juncture, after Folberth and his partner, standing on the running board while the car was in motion had plied the aforementioned linen handkerchief tied to the stick until their arms were nearly ready to drop off, that Folberth began to realize the possibilities of an automatic windshield wiper and the convenience it would be to the motorist. At first it was

merely an idea and he had no definite plans for constructing such a device, but shortly after the tour had been com-

pleted he started experimental work with a view to developing a cleaner that would be economical and wholly efficient.

The first contrivance with which tests were made dripped a chemically compounded liquid over the glass of the windshield during the rain or snow-storm which mixed with the water and caused it to run off the glass, thus giving the driver a clear vision.

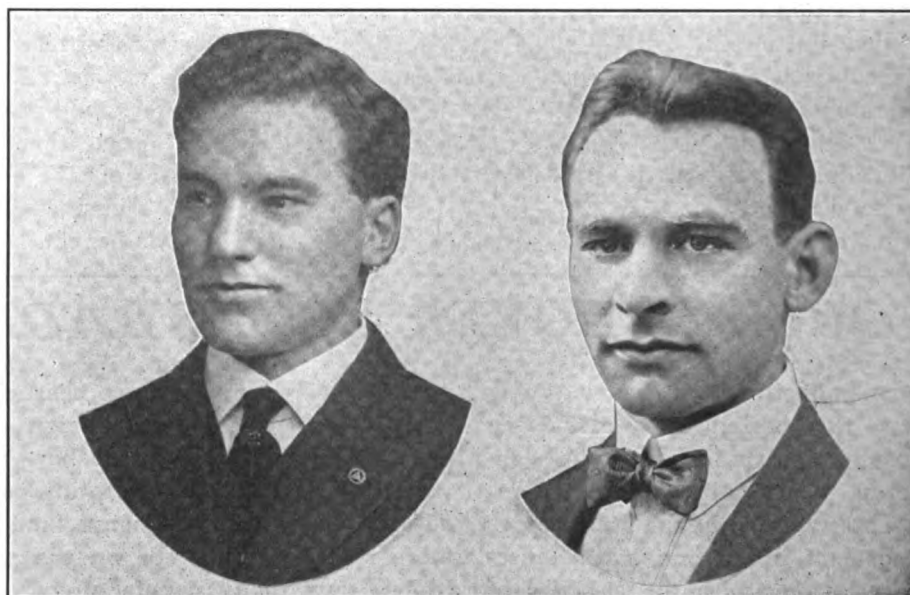
This worked successfully at the first trial as the inventor fully expected it would since the principle involved was entirely practical. All during the rain storm it kept the windshield beautifully clean and Folberth had good reason to feel that he had successfully solved the problem.

But he was soon to be disillusionized because immediately the rain ceased and the dust began to fly an opaque blanket of dirt formed on the glass where the chemical had dripped, effectively shutting off the driver's vision. Once it had been allowed to dry it resisted every effort but the strongest armed cleaners to remove it from the glass, clinging like paint to the surface.

"A fine substitute for ground glass could have been made by using the chemical," said Folberth in recalling the subject, "but it was hardly the thing for a windshield cleaner."

The next method tried made use of electrical energy for its operation. It worked well enough for the greater part of the time, but Folberth felt that it used too much current to make its use practical and it was discarded.

As a matter of fact one of the most important phases of the original idea had been to so construct the cleaner that it would cost little to operate and while the method described might have been



President Fred G. Folberth and Vice-President William M. Folberth of the Folberth Auto Specialty Company, Cleveland, O.

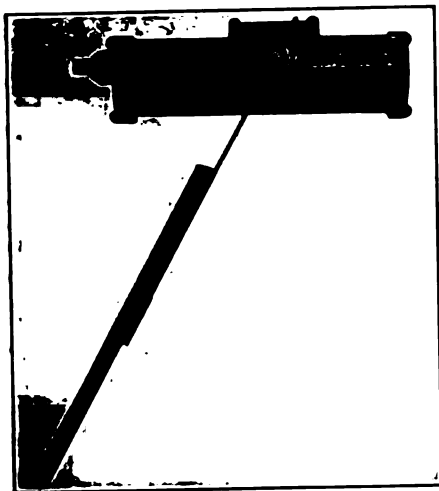


Carl J. DeWitt, General Sales Manager, Folberth Auto Specialty Company.

worked out to a place where it could undoubtedly have been successfully marketed, it did not entirely suit Folberth because of the excess current consumed and for this reason was not adopted.

Tried Using Heat from Exhaust.

It was at this juncture that William Folberth became interested with his



Simplicity of Design Is a Feature of the Folberth Automatic Windshield Cleaner.

brother and since that time the two have worked together. The next method of obtaining the desired result to claim the attention of the brothers was that of using heat from the exhaust in a double windshield. This plan, which from a purely theoretical standpoint should have met with success, worked finely in winter, but entirely failed in summer, due to the fact that it turned the moisture to steam, which had the effect of obscuring the driver's vision even more than did the rain.

It would have been an ideal plan had it worked successfully; it had no moving parts and the operating expense was nil, but since its use was impractical during several months of the year it too was abandoned.

A series of celluloid windshields set crosswise to the glass was the next design given consideration. Slightly slanting downward these shields effectively kept the glass clean in all kinds of weather — except when the wind was blowing. During the heaviest rain or the hardest snow storm they gave the driver a clear vision—but the minute a breeze of any strength sprung up the rain drove in under them, making them worse than useless since it was next to impossible for the driver to get at the glass to wipe it while they were attached to the windshield.

At this point the Folberths, thinking they had made quite enough unsatisfactory tests, planned to quit work for a

time and devote their attention to other pursuits. But the idea of an automatically operated windshield cleaner would not down and again we find them hard at their experiments, this time with another electrically actuated cleaner.

This device, ingeniously designed and apparently destined to be successful, was in the form of a disc with a scraper attachment that was fastened to the outside of the windshield glass.

Regardless of whether it was raining or snowing it cleaned the glass perfectly, but unfortunately, it was impossible to make it revolve in a manner fast enough to clean the part of the windshield that the driver desired to look through at the time that he needed to use it, and because of this and the impracticability of revolving it faster without the use of excessive current it was decided to discard it.

It was at this period in the development of the cleaner that Fred Folberth was drawn on a jury which sat at a trial resulting from an automobile accident, the apparent cause of which was directly traceable to faulty vision consequent on a heavy rain storm.

From then on the brothers started out with renewed effort to find some method of automatically cleaning the windshield that would work in any and all kinds of weather.

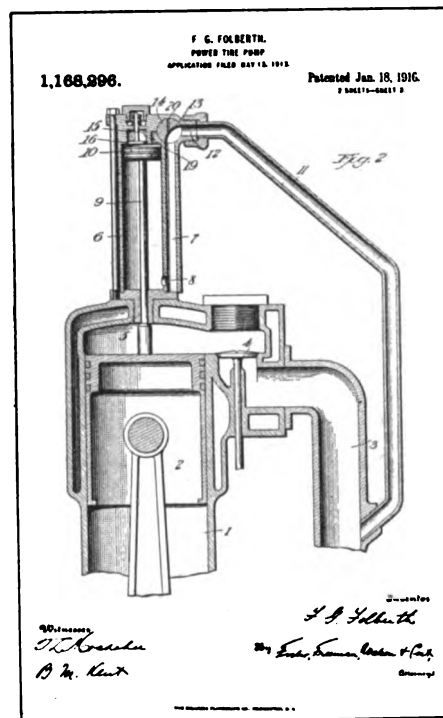
They succeeded well enough with their next arrangement, which consisted in effect of a series of springs that jerked a rubber bladed wiper from side to side. Here again it appeared that they had found a satisfactory solution to their problem.

This wiper worked remarkably well, kept the windshield beautifully clean and it is indeed doubtful if the present device manufactured by the company, so favorably known for its lasting worth and true efficiency, cleaned the windshield any better than did the spring arrangement. But this too was discarded for the very good reason that it was too complicated to turn out in quantities, a special pattern having to be designed for each different make of car.

To explain just what led up to the present invention the reader must go back a bit.

Folberths Known as Inventors.

The Folberths have been known to the industry for more than a decade, one of their first successful inventions being a tire pump which operated from the vacuum of the engine. This pump, final patent papers of which, though applied for in 1913, were not issued until January, 1916, was manufactured in quantities about eight or nine years ago and was extensively used by several different car manufacturers, among them being the Chalmers Master Six and the Jeffreys Chesterfield, each of which installed sev-



Early Invention That Played Important Part in the Development of the Cleaner.

eral thousand of the pumps as standard equipment.

Many will also remember the Folberths as the inventors of the very successful and practical three-speed planetary transmission which was given to the trade in 1905. They have also to their credit a tire pressure gauge and a carburetor, either of which in the writer's opinion could be placed on the market at the present time and meet with quick success.

It was to the principle of the vacuum operated pump that the brothers turned for their windshield wiper and here they met with real success, producing a cleaner that is known throughout the industry.

This cleaner is of what may be termed the automatic vacuum type. It is operated in a semi-circular path around a central point by a very small portion of the vacuum of the



View Showing Portion of Main Offices of Folberth Auto Specialty Company.

intake manifold of the motor.

In order to operate the device the adjusting handle or valve control is turned to open the valve. The vacuum of the intake, operating through the tube connecting the device with the intake manifold or vacuum system of the automobile, extracts the air from the front end of the cylinder and the atmosphere pressure in the other end acts against the rear piston and forces it forward.

At the end of the stroke of the piston the lever arm closes a valve, preventing extracting of air from the front end of the cylinder and automatically opens the outlet in the other end through the by-pass.

The process is then reversed when the air is extracted from the back of the cylinder, the added pressure on the front piston forcing the pistons back to their original position.

The operation of the rack between the two pistons turns the quadrant, which in turn operates the arm of the windshield cleaner, which is moved in a semi-circular plane. When installed on the windshield this action causes the squeegee to rub over the outer surface of the glass and to remove any rain, mist or snow that may be present.

The foregoing to the layman may sound a bit intricate, but a little study of the text with frequent reference to the picture of the disassembled view will show just how simple the device really is, also giving one an idea of its ingenious construction. Engineers in high standing have stated that the Folberth windshield cleaner is as nearly a scientific product as one ever sees.

The hole in the manifold through which the suction that actuates the cleaner passes is hardly as large as the point of a pin, and yet so strong is the vacuum that it requires all one's strength to stop it from operating regardless of how good a grip he may get on the moving member at the point where it joins the vacuum tube.

The cleaner in tests at the factories of various automobile companies has run thousands of hours with absolutely no wear noticeable except on the cleaner blade, which is readily replaced at small cost.

The vacuum chamber of this cleaner, and in fact every part of the finished product, is as finely machined as it is possible for it to be. It is air tight—or vacuum tight rather, and because of the method by which it is put together never gets out of adjustment.

Oiling is taken care of at the time the cleaner is constructed, sufficient oil being placed in the cylinder to last for several years. For this purpose Folberth uses a specially blended oil, which has proven satisfactory under all weather conditions. The cleaner is positive in action and its

use in no way effects the adjustment or action of the motor since the power used is almost too small to be measured. Because of its superior construction and small number of moving parts the cleaner is absolutely silent in operation and will remain so throughout the life of any car on which it may be placed.

Cleaner Should Last for Years.

As a matter of fact it should last for many years because of the fact that there is nothing to get out of order, except possibly the rubber cleaner blade as noted and the tubing, which also may be renewed when necessary.

The process by which the Folberth Automatic Windshield Cleaner is manu-

Two Models Manufactured.

Two models of the cleaner are manufactured. The one for commercial distribution is of a plain black finish, while the other, used on the finer grades of automobiles, is furnished with specially designed ends, which give the device a somewhat different appearance from the regular stock model.

All cleaners are finished with a special enamel, the company's name plate being processed on to the chamber, the whole making a beautifully finished job.

Folberth windshield cleaners are built in a modern fireproof plant, located at 7914-22 Lake Avenue, Cleveland, O. There are about two acres of land adjacent to the factory that is owned by the company, the whole property being located in the heart of Cleveland's manufacturing center. The present plant, though of large size, is proving inadequate for the building of the cleaners in quantities such as the company is now receiving the orders for, and it is fortunate that there is the room for expansion available, as it is very probable that additions will have to be made to the present facilities within a short time.

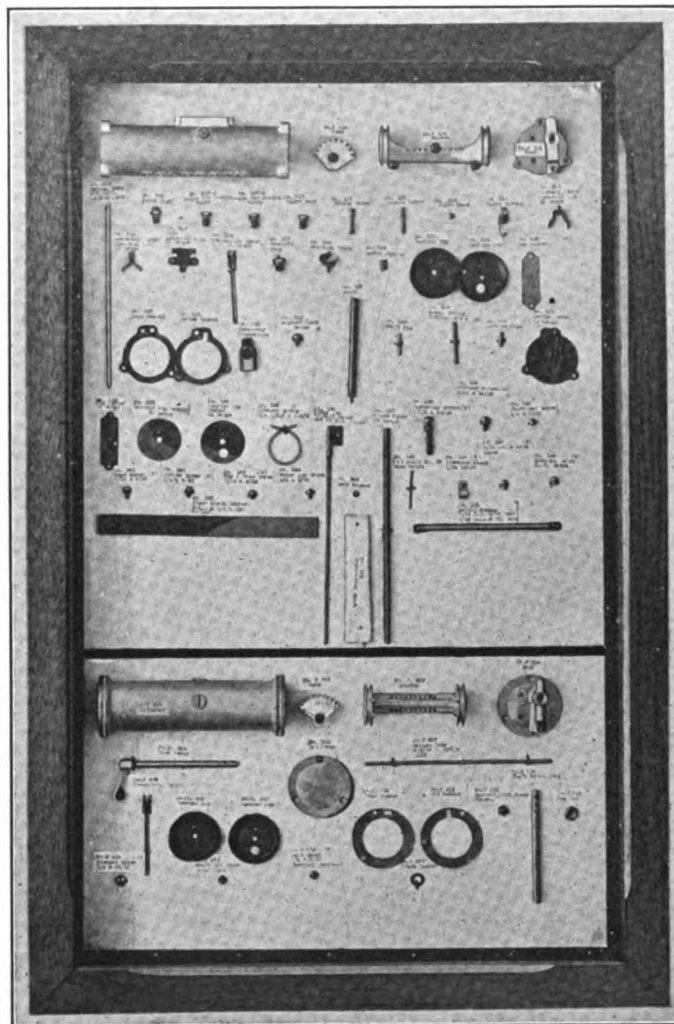
Today, a scant four years since the business of making the Folberth Automatic Windshield Cleaner became firmly established there are literally thousands of these devices on the market and business has increased by leaps and bounds until at the time I visited the factory about three weeks ago, a careful audit of the orders on file showed that the business of 1922 to date, as compared with a corresponding period two years ago, is increasing at the rate of more than 500 per cent., the company, according to Sales Manager Carl J. DeWitt, being at least a month behind in shipping orders at the present time.

The first three years that the concern operated were in a sense given over to experiment and it was only two years ago that business really was gone after. Last year was the first time that any inten-

sive drive had been made by the firm, the result being that literally hundreds of thousands of the devices have been made and sold since that time.

The United States has been the big market of course, but Canada also has offered a fine outlet for the cleaners, to say nothing of the thousands that have been sent abroad on unsolicited orders to Japan, England, Germany, France, Sweden, India, Scotland, Java, Africa, Argentine and even far off Australia.

The Folberth Windshield Cleaner is distributed exclusively through jobbers, except those which are sold direct to the manufacturers of automobiles, among which I remember are numbered Cadil-



The Cleaner Disassembled, Top—The Commercial Model. Bottom—Manufacturers' Model.

factured is worthy of more than passing note. Because of its unusual design special shop machines have had to be developed for every operation connected with its construction. These machines, all of them specially developed by the Folberth Brothers, are highly ingenious and handle the several operations of building the cleaner in a truly scientific manner. The entire work of machining the different parts while simple enough to watch shows that unusual genius has been concerned in the development of the special machinery and the result viewed in any way gives one the impression that every operation is specialized.

lac, Cunningham, Marmon, King and Aperson.

All operations, designs and patterns are patented in the principal foreign countries as well as the United States, and the company is represented in practically all of the principal markets of the world.

Universally Used.

As evidence of the popularity of this device it may be mentioned that it is used by a majority of the fire and police departments of the largest cities and other public motor fleets, while a large market has recently developed without special effort on the part of the company among big users of the automobile or truck.

Motor boats are being equipped with the device; it is installed on many airplanes and even dirigible balloons used in experimental work by various agencies are fitted with these efficient cleaners.

property of the owner, to say nothing of fellow motorists, and in my opinion pays for itself many times over in comfortable, safe, worry-free driving.

For doctors and others who may be called out at any time of night to go long distances in foggy, rainy or snowy weather, it would seem to be indispensable.

The Folberth Automatic Windshield Cleaner has many good points other than the insurance against accident it affords to recommend it to the driver. Perhaps the most important of these from an economic standpoint is that it costs nothing to operate as it is actuated by a very small portion of the suction of the engine, a force which hitherto has been wasted.

Easily Installed.

Then, too, the installation of the cleaner is very simple and one who is in any way versed in the handling of tools can

helps, some of which are in the form of automatically operated windshield cleaners for use in window displays, have been prepared which greatly aid in the sale of the product.

The Folberth Auto Specialty Company is the name under which the Folberth Automatic Windshield Cleaner is manufactured. The officers of the corporation are Fred. G. Folberth, president, and his brother William M. Folberth, vice president; Carl J. De Witt, a well known figure in the motor world being in charge of sales and advertising.

I have had an experience that falls to the lot of few men in that I have been privileged to talk with many successful business men and to hear from their own lips the story of their success. The one thing that they appear to have in common—the outstanding characteristic of every story—is the fact that they started small, worked almighty hard and in almost every instance were unsuccessful in obtaining that perfection which they sought until 10 or 15 years from the time they first started out in business.

This then must be the true "secret of success" that one hears so much about, although it doesn't seem like much of a secret—just hard, exhaustive labor, repeated disappointment and failure and in most cases the worry of raising the necessary capital with which to carry on.

A price, rather than a secret, I should call it.

It is just because of what I know about the ceaseless effort demanded if one is to be successful that I incline to get a bit angry when I hear someone casually mention the "luck" of an individual who seems in some easy manner to have achieved success, because I know that underneath all the seeming "luck" is a story of bone labor and near-privation that would make the average man quit in disgust long before the job was properly finished.

"There is no royal road to success," says an oft-used quotation and it speaks truly. True success, every bit of it, is earned—dearly bought as a rule by long hours of arduous work, nights spent in planning and the ever present lack of financial backing. The history of any one great success is the history of all, according to what I have been able to learn by the close observation of several years—and the story of the Folberth Automatic Windshield Cleaner runs true to type.

A development rather than a fortunate discovery, the work of bringing it to its present place in the industry has been especially hard, the more so because those responsible for its success were unwilling to be satisfied until such time as they had developed the ideal device, a cleaner that was operated at no cost to the car owner and one that was so constructed as to last indefinitely, needing no attention from the operator.

No, luck hasn't played much of a part in the building of the Folberth Automatic Windshield Cleaner. It has been developed by sheer hard work, exhaustive research and experiment—which after all isn't too great a price to pay I think—in view of the results obtained.



Portion of Final Assembly Department Showing Enameling Room in Background.

Automatic Cleaner Boon to Motorist.

The automatically operated windshield cleaner for driving in heavy fog, during rains, snow or sleet storms, is a boon to the motorist. Anyone who has ever tried to drive for any distance during a rain storm cannot fail to appreciate the satisfaction afforded by one of these devices.

In the first place their use allows the driver to concentrate all his attention on holding the car on the wet, slippery road with both hands free to be used where they are needed, the more especially if one happens to be driving without chains or in the night when gears, horns, dimmers and perhaps the emergency brake may need constant attention.

To my way of thinking an efficient windshield cleaner at such a time is the nearest thing to a necessity that one can well imagine.

Surely it is a safeguard to the life and

easily install it as the process consists merely of attaching the chamber of the cleaner to the top of the windshield frame, in front of the driver's seat, threading the flexible rubber tube down the side of the windshield frame with special attachments, through the dash, and then connecting it to the intake manifold by means of fittings which are furnished with each unit. Surely a simple enough process.

The jobbers handling the Folberth Automatic Windshield Cleaner are equipped to install the cleaner in a very short space of time. Thus far the company has been very successful in getting its product into a varied market, the utility and proven worth of the cleaners going a long way toward selling them to the trade.

All jobbers taking over the line are given exceptional cooperation by the company and many very good dealer

Dealers Studying Cost of Operation

COST of operation is the item that automobile dealers are giving more attention to at present than any other perhaps outside of immediate selling according to information gathered by the National Automobile Dealers' Association representatives in investigations that now cover the entire country.

Since March of this year every city of more than

50,000 population has been visited by representatives of the organization and dozens of cities of from 50,000 to 15,000 also have been made. In each of these cities the leading dealers and distributors have been conferred with concerning future developments in the industry and their desires and suggestions will be used as the basis for adding to the business service programme of the N. A. D. A.

THE insurance service provided for members of the N. A. D. A. "One of a Thousand," is being received by the dealers as a very definite asset, not alone from the viewpoint of the immediate results obtainable, but as indicative of what can be accomplished by the high grade automobile merchants. It seems to be very clear that the dealers have actually taken up a study of costs for they are asking as to costs of various departments of the automobile business in localities other than their own.

How are salesmen generally being handled and paid? Commissions or salaries, or both? How can better salesmen be obtained? What is the practise on finding and reporting prospects? What are the systems most in use?

What are the developments in dealer advertising in various parts of the country? How do the dealers like the factory advertising campaigns? Will the factory advertising campaigns ever be improved?

Are there any statistics or is there any widespread data available as to the cost of selling per car? Is there any definite data possible on the average percentage of overhead? Has anything been worked out as to the definite departmentizing of cost accounting?

Can maintenance departments be made to show a profit and how? What are some of the systems used to fix costs in the maintenance department? Will it become necessary in properly maintaining

these transportation units to come to a seven-day, 24-hour maintenance service?

The questions are almost innumerable. But one significant fact sticks out and that is that the used car which has been a very prominent subject in dealer discussion in the last two years has not continued to absorb all of the discussion. It does come up and there are frequently questions as to how it is being handled. But these questions are directed in other directions. There seems to be considerable interest in the no-trade idea. There seems to be also some one or two things that are being added to the long list of plans designed to be a panacea for the "used car problem."

One dealer has advanced as his plan, that he will allot to his salesmen a fixed amount of money which the salesman can use in making deals in which there is a trade-in. He has five salesmen. He will provide \$2500 for this used car purchase fund. Each salesman will have a maximum of \$500 in this fund. The salesman can spend all of his \$500 on trading one deal or he can spend it on five deals. But when he has reached his limit he cannot trade any more until he has restored his trading credit by seeing to it that the used cars are sold. When the used cars are sold the money from them is restored to the salesman's trading credit.

The salesman may make one trade, allowing the full \$500 on one job. If this job is sold for \$400 the profit, commission of salesman and selling-cost are de-

ducted from that figure. Maybe it cost \$50 to prepare the car and sell it, plus five per cent. commission (\$20) and plus 20 per cent. commission for the house (\$80), which make \$150. The balance of \$250 is returned to the credit rating of the salesman. He can now only trade for \$250 total. If he ultimately uses up his trading credit obviously he cannot make trades.

If on the other hand the salesman has trade for a car on which he allowed \$400 and the selling cost, plus commission for salesman and for the house amounted to \$150 and the job sold for \$700, there is returned to the salesman's trading credit \$550, which with the balance of \$100 that was unused in the trade, gives him a total trading credit of \$650. He has increased his own selling possibilities by increasing his own buying possibilities. The firm has profited and will profit more as the salesman builds up his trading credit. It puts the salesman in the position where the chief executive of the business has always been placed before, fixing the allowance, for the salesman loses instead of the house.

And there is the subject of financing time sales. The dealers say the finance company rates are almost prohibitive in view of money conditions. That the rates are a source of sales resistance.

The subject of factory relations with dealers is not very prominent. Some dealers are complaining. It is not a high point of the dealer thinking however.

VALUE OF QUICK STOCK TURNOVER.

(Continued from Page 411.)

The fundamental unit in which equivalent investment is expressed is the dollar-year. It may also be expressed in some related unit which is reducible to dollar-years, such as dollar-months or dollar-weeks.

In explanation of this one dollar invested for one year is a dollar year. Two dollars invested for six months, or three dollars invested for four months, or 50 cents for two years are all exact equivalents of a dollar-year.

Thus, if you invest \$500 in a certain article or commodity twice a year, you have an equivalent investment in that particular article of \$250. Suppose your sales of this article for the year to be \$1000. By dividing the equivalent investment of \$250 into your sales of \$1000, you find that your rate of turnover is four. If you invest \$500 in a given article every three months you have an equivalent investment of \$125. If your sales of

that article for the year amount to \$2000 your rate of turnover is 16.

Relation Between Turnover and Profit—A business man pays a certain amount for the goods he sells, and he sells them for a certain other amount usually greater than the first. It is the difference between these that determines the success or failure of a business. The merchandise itself is only a means to an end, so to speak.

For certain reasons a merchant may want to invest as little money as possible in stock. The turnover of this investment, then, becomes of great importance for he must get his original investment back before he can invest it again. This turnover is dependent largely upon the movement of the goods, but the unit profit and the extension of credit also play an important part. An analysis of the turnover will largely determine the advisability of extending more or less credit and the amount of unit profit necessary with the given investment and the probable sales.

CONTINENTAL SHOWS LIGHT SIX.

(Continued from Page 429.)

through the connection rod just below the piston pin, which is grooved to fit the bolt.

Four main bearings support the crankshaft.

The valve mechanism is simple, involving a minimum number of parts. Push rods ride directly on the cams of the camshaft. Push rods are fitted with an adjusting screw and locking device. The valve guides are removable. They are 3/8 inch long and are reamed to fit 5/16-inch valve stems. Three cover plates protect the valve mechanism and retain the mist of oil in which it operates. Valve adjustment, when required, is most simple, as there is exceptional accessibility to the valve tappet chambers. Push rod guides are removable. They are made in three groups of four each and arranged in such a manner that a complete assembly of four push rods can be removed as a unit.

International Roads Congress to Meet

A CERTAIN indication that after eight years of war and upheaval the world is beginning to return to a normal state is contained in the announcement that the International Road Congress, which ceased operations in 1914 because of the European conflict, is to resume its deliberations early next May in Seville, Spain. The programme for what promises to be the greatest and most important conference on highway improvement ever held has just been received from the office of the general secretary in Paris.

CANADIAN delegates will go to the meeting determined to bring the next congress to Canada. The first congress was held at Paris in 1908, the second at Brussels in 1910 and the third at London in 1913.

A subject of particular interest to highway enthusiasts in this country that will be discussed by noted American engineers will be the latest methods evolved in the construction of the various types of roads now being constructed in the United States. Among the American paving experts who will discuss these subjects are Julius Adler, deputy chief, bureau of highways, Philadelphia, Pa.; Lieut. Col. Walter Wilson Crosby, highway engineer, National Park Service, Coronado, Cal.; G. C. Dillman, deputy state highway commissioner, Lansing, Mich.; George P. Hemstreet, vice president, Hastings Pavement Co., New York; Prevost Hubbard, chemical engineer, the Asphalt association, New York; William H. Kershaw, New York; Leroy M. Law, chief chemist, New Orleans Refining Co., New Orleans, La.; Irving W. Patterson, chief engineer, Rhode Island State Board of Public Roads, Providence, R. I.; Clarence A. Proctor, superintendent of asphalt construction, Detroit, Mich.; John R. Rablin, chief engineer, Park Engineering Department, Massachusetts Metropolitan District Commission, Boston, Mass.; Francis P. Smith, New York City; W. Leroy Ulrich, superintendent of repairs, Connecticut State Highway Department, Hartford, Conn., and George C. Warren, president, War-

ren Brothers Company, Boston, Mass.

Three of the six days of the congress will be given over to a discussion of the development of motor traffic and transport. Among the Americans on the programme for a discussion of these subjects are: Austin F. Bement, vice president and secretary of the Lincoln Highway Association, Detroit, Mich.; Prof. Arthur H. Blanchard, Ann Arbor, Mich., ex-president, National Highway Traffic Association; Lieut. Col. H. L. Bowlby, U. S. Bureau of Public Roads, Washington, D. C.; Roy D. Chapin, vice president, National Automobile Chamber of Commerce, and president, Hudson Motor Car Co., Detroit, Mich.; James H. Collins, manager, Commercial Survey Department, the Chilton Company, Philadelphia, Pa.; Charles Henry Davis, president, National Highways Association, Cambridge, Mass.; Ernest Farr, chief, Firestone Ship-by-Truck Bureau, Akron, O.; F. W. Fenn, secretary, National Motor Truck Committee, National Automobile Chamber of Commerce, New York; H. P. Gould, chairman, Truck Owners' Conference, Chicago, Ill.; Prof. William K. Hatt, director, Advisory Board of Highway Research, National Research Council, Lafayette, Ind.; Theodore R. Kendall, engineering editor, the American City, New York; General T. Coleman du Pont, United States senator from Delaware and chairman, Board of National Councilors, National Highways Association, Wilmington, Del.; Henry E. Riggs, professor of civil engineering, Uni-

Thousands of delegates representing national and state governments and good roads associations in the United States, Belgium, Canada, Australia, New Zealand, China, Japan, France, Great Britain, Italy, Holland, Sweden, Denmark, Switzerland, Argentina, Czecho Slovakia, Spain, Portugal, Norway, Germany, Jugo Slavia, Poland, Austria, Cuba, Chili, Brazil and many other countries, will participate in the congress and exchange views and experiences for mutual benefit. English, French and Spanish have been adopted as the official languages.

versity of Michigan, Ann Arbor, Mich.; Leonard S. Smith, professor of highway engineering, University of Wisconsin, Madison, Wis.; Thomas Snyder, secretary, National Association of Commercial Haulers, Indianapolis, Ind., and Lieut. Col. W. D. Uhler, chief engineer, Pennsylvania State Highway Department, Harrisburg, Pa.

During the session on traffic regulations the following Americans are scheduled to participate in the programme: David Beecroft, directing editor, the Class' Journal Company, New York; C. J. Bennett, vice president, American Association of State Highway Officials, and state highway commissioner of Connecticut, Hartford, Conn.; Julian Chase, executive editor, the Class Journal Company, New York; George C. Diehl, president, American Automobile Association, and engineer, Erie county, Buffalo, N. Y.; M. O. Eldridge, director of roads, American Automobile Association, Washington, D. C.; William S. Gilbreath, manager, Detroit Automobile Club, Detroit, Mich.; A. R. Hirst, state highway engineer, Madison, Wis.; John N. Mackall, chairman and chief engineer, Maryland State Roads Commission, Baltimore, Md.; D. P. McComb, chief engineer, State Department of Highways, Nashville, Tenn.; Harry Meixell, secretary, Motor Vehicle Conference Committee, New York; George H. Pride, treasurer, National Highway Traffic Association, New York; Henry G. Shirley, chairman, Good Roads Board, American Automobile Association, and chairman, State

Highway Commission, Richmond, Va.; Elmer Thompson, secretary and general manager, Automobile Club of America, and secretary, National Highway Traffic Association, New York; Thomas J. Wasser, president, American Road Builders' Association, and state highway engineer, Trenton, N. J.; Henry C. Allen, Syracuse, N. Y.; J. Rowland Bibbins, manager, Department of Transportation and Communication, Chamber of Commerce of the United States, Washington, D. C.; William P. Eno, Washington, D. C.; H. J. Fixmer, engineer in charge of pavement construction, Board of Local Improvements, Chicago, Ill.; Nelson P. Lewis, member, Commission on the Port of New York, New York City; R. S. McElwee, dean, School of Foreign Office, Georgetown University, Washington, D. C.; Frank T. Sheets, Illinois state superintendent of highways, Springfield, Ill.; H. C. Smith, assistant professor of high engineering and highway transport, University of Michigan, Ann Arbor, Mich.; Samuel W. Taylor, editor, the Rider and Driver, New York City, and George A. Walters, deputy commissioner, Department of Police, Detroit, Mich.

One of America's Finest Highways Opened.

Perhaps no highway in the United States excels in scenic beauty, completeness of design, perfection in construction and prospects for long usage at low maintenance cost than the famous Lackawanna Trail, recently opened with elaborate ceremonies by the governors of New York and Pennsylvania.

This splendid highway traverses a veritable scenic wonderland and follows the road bed of the old Lackawanna railroad between Scranton and New Milford, Pa., running thence to Binghamton, N. Y., by way of Hallstead and Conklin.

A part of the road consists of an asphalt pavement, while a certain section is of concrete. The highway is a federal post road for the most part built on land donated by the Delaware, Lackawanna and Western Railroad Company to the State

of Pennsylvania, and is 33 miles long. The road cost \$2,000,000 and was built by the Pennsylvania State Highway Department, beginning in 1918 and continuing until June 28 of this year.

The pavement is 18 feet wide, with five-foot shoulders on each side throughout the entire length of the road, the total width, therefore, being 28 feet. All railroad grade crossings have been eliminated. Thirty miles of the road are level throughout and on the remaining three miles no grade is over six per cent. The trail is the final link in a beautiful stretch of highway between Scranton, Pa., and Binghamton, N. Y., 62 miles in length. The road at one point parallels the great Nicholson viaduct, one of the largest bridges in the world; a structure that is 240 feet high and 2375 feet long.

On the first Sunday following the dedicatory ceremonies and the opening of the road, 10,000 automobiles passed over the new highway, by actual count. Most of the cars made the trip from Scranton to Binghamton or vice versa in two hours' time.

Road Building Boom in Canada.

Reports to Highways Information Service, New York, from the various Canadian provinces for June, 1922, show contracts for new roads and streets let during that month to the value of \$3,774,200. The total number of contracts let was 72. New projects reported under consideration numbered 146 and were to cost \$4,697,600. The value of the new construction contracted for during June in each province was as follows: Ontario, \$1,664,900; Quebec, \$822,000; New Brunswick, \$151,900; Nova Scotia, \$115,000; British Columbia, \$383,300; Alberta, \$16,500; Saskatchewan, \$26,000; Manitoba, \$47,400.

Planting Trees Along the Highways.

To make Minnesota famous as "the state with the tree-lined highways" is the object which the forestry department of that state has set out to accomplish. The department will plant 30,000 trees along the highways this year and each year hereafter will add to the num-

ber. What Minnesota is doing is also being done in Pennsylvania and many other states. Experts declare that if the trees are set back far enough their roots will not injure road pavements. It was contended at one time that tree roots and the shade cast by the branches were detrimental to certain types of paving, but experience in Washington, D. C., and other cities, especially in Florida, Illinois, Massachusetts and California, containing beautiful tree-lined asphalt streets have completely exploded the idea.

Fine Stretch of Lincoln Highway Completed.

Thomas J. Wasser, state highway engineer of New Jersey, announces that word has been received by the New Jersey State Highway Department from the Lincoln Highway Association to the effect that the new stretch of Lincoln Highway completed and thrown open to the public between Elizabeth and Rahway in New Jersey is the finest existing stretch of the transcontinental road between New York City and San Francisco.

The new road, which has been under construction for over a year, eliminates the last detour on the Lincoln Highway between New York and Philadelphia. This section of the transcontinental road carries the heaviest traffic of any of the 3300 miles between the Hudson river and San Francisco bay and the specifications of the new section reflect the volume and weight of this traffic. The entire section is 29 feet wide.

This section of New Jersey's Lincoln Highway is designed to handle, without danger and with the utmost convenience, the immense volume of traffic moving between New York and Philadelphia, including thousands of trucks.

Paris Inaugurates Big Street Programme.

The municipal authorities of Paris, France, have begun carrying out a vast programme of street improvement authorized some time ago. The sum of 11,500,000 francs is being spent for the transformation of stone paving into another type,

with more money to be expended later. Among the streets to be improved are the Grand Boulevards, Rue de Rivoli, Rue Montmartre, Rue de LaFayette, Avenue du Bois de Boulogne, Place de la Concorde, Boulevard Malesherbes, Avenue des Champs Elysees, Place Vendome, Place de L'Etoile and a score of others more or less familiar to thousands of Americans.

Mysterious Road Secret Discovered.

Motor cars of all kinds have long been known to gather speed in some unaccountable manner when passing over smooth roads. The cause has long been unexplained, but it is now held, both by automotive engineers and road engineers, to be due to the abnormal profusion of vegetation usually to be found along these "mystery" roads. Trees and plants exhude oxygen. Motors run more smoothly when there is plenty of oxygen in the air, as motorists are well aware. The increased amount of oxygen diffused in the localities where the vegetation is profuse, coupled with the smoothness of the road surfaces and the consequent decrease in tractive resistance, constitute the cause of the "picking up" of the motor and the increased speed. Scientists recently conducted experiments in several localities and along roads bordered by heavy vegetation and these experiments demonstrated to their complete satisfaction that the behavior of the car was due to the increased amount of oxygen in the air.

Big Increase in Highway Contracts.

Statistics compiled by Highways Information Service, New York, show that for the first five months of 1922 a sum of \$35,258,000 more has been awarded for road and street construction in the United States than for the corresponding period in 1921. In May, 1922, contracts let amounted to \$9,626,000 more than the contracts let in May, 1921. The figures show that notwithstanding a late start this year the programme of constructing better highways is progressing more rapidly than ever and that this favorable condition will continue until fall. Contracts awarded for road and street con-

struction in the United States during the first five months of 1921 and 1922 were valued as follows:

	1922	1921
January ...	\$22,689,000	\$17,397,000
February ..	13,578,000	18,074,000
March	59,504,000	38,820,000
April	49,487,000	46,539,000
May	63,426,000	52,596,000
Total....	\$208,684,000	\$173,426,000

The figures showed also that average prices, January to May, 1922, for road materials were 20 per cent. lower than for the same period in 1921, and that the amount of materials used, as well as labor employed, increased 50 per cent.

Southern States Have Big Road Programmes.

In road building and street paving work the southern states are showing greater activity than at any time in their history. Contracts reported during the past four months aggregate in value about \$40,000,000. Every state in the South is showing tremendous progress, especially in road improvement. Contracts awarded in the last four months include, in value, the following: Alabama, \$1,870,000; Arkansas, \$842,000; Florida, \$4,800,000; Georgia, \$780,000; Kentucky, \$870,000; Louisiana, \$932,000; Maryland, \$966,000; Mississippi, \$844,000; Missouri, \$2,735,000; North Carolina, \$7,780,000; Oklahoma, \$1,975,000; South Carolina, \$1,104,000; Tennessee, \$833,000; Texas, \$6,657,000; Virginia, \$690,000; West Virginia, \$4,523,000.

In addition to the actual contracts awarded there is a tremendous volume of highway improvements for which plans are being made and for which bids will be received during the year. An impressive amount of construction is under way in the South, especially in North Carolina, Tennessee, Texas, Florida, Kentucky, Arkansas, Oklahoma and West Virginia.

Police Chiefs Want Wider Roadways.

Following close upon the action of the recent Good Roads Congress in Chicago which, in a resolution, declared for a minimum width of 20

feet for highways, in deference to increasing traffic, the National Convention of police chiefs, held in San Francisco, recently adopted a resolution demanding wider streets and roads so as to facilitate the regulation of traffic. In cities like New York, Chicago, Boston, Providence and others, narrow streets not only induce accidents, but are big factors in traffic tie-ups. A committee was appointed at the convention to work for a uniform, nation-wide code of traffic signals and regulations.

Florence, S. C., a city of 11,000 population, has begun work on a \$1,000,000 street construction programme. The city of late has experienced a remarkably rapid growth. The new pavement will make this city one of the best paved for its size in the country.

Ira L. Johnson, who was formerly experimental engineer with the Minneapolis Steel & Machinery Company, Minneapolis, has accepted a position as machinist for the Gilbert Manufacturing Company, Aberdeen, S. D.

Clarence K. Sencebaugh has been appointed general manager for the Caloric-Rime Company, Chicago. He was formerly division manager of the Toledo Coldmaker Company, Toledo.

Henry L. Brownback has organized a firm of consulting engineers under the title Henry L. Brownback & Associates, Norristown, Pa.

Howard D. Dabney has been made cashier and credit manager for Charles W. Williams & Co., New York City. He was formerly general manager for the Automotive Electric Service Association, also in New York City.

John J. Bradley, Jr., is no longer associated with the Lincoln Motor Car Company, Detroit, but is electrical equipment inspector for the Ford Motor Company, also of Detroit.

G. Walton has become affiliated with the Pontiac Valve Company, Pontiac, Ill. He was formerly manager of sales and engineer for the Self-Seating Valve Company, Chicago.

Thomas Towne has severed his connection with the Federal Tool & Alloy Steel Corporation, New York City, where he was first vice president and general manager. His future plans have not been announced.

Raymond W. Scott, previously superintendent of the Washington Auto Company, Yakima, Wash., has been elected president and manager of the Yakima Grinding Company, also of Yakima.

Jervis R. Harbeck has become associated with Joseph P. Day, Inc., New York City. He was formerly vice president of the Willys Corporation, also of New York City.

The Trend of American Tire Markets

THE United Kingdom, with its 463,000 cars and trucks, is today not only the largest foreign user of American tires, but as an American tire market presents a very encouraging outlook. From an examination of the accompanying chart it will be seen that the value of the United Kingdom's tire imports from the United States during the 12 months ended June 30, 1922, was almost equal to the imports for the peak year of 1920. As tire prices are now about one-half of what they were in 1920, it is evident that nearly twice the number of tires have been shipped from this country to the United Kingdom during the past 12 months, as compared with 1920. Only for a short time in the early part of 1921 was a reaction in British tire buying evident.

AN EXAMINATION of England's tire purchases from Canada will reveal quite a different condition. They were very large in 1920, but have declined to a relatively low level since early in 1921. It is probable that a lower cost of production in the United States, as compared with Canada, is the reason for this condition.

Possibly some of England's large purchases are ultimately transshipped to other countries on the Continent, though it is probable that this portion is not relatively important. In any event, the same possibility would have existed in 1920, so that the comparison is a fair one and indicates unmistakably the present healthy trend of the British market for the sale of American tires.

Importance of Canadian Market.

One would not suppose that Canada would buy many tires made in the United States, principally because of the very strong local tire industry, the high protective tariff and the past depression in Canadian exchange. However, the United States actually ships large quantities of tires to Canada every month. Canada's 463,000 cars and trucks are a relatively large number as compared with almost any other foreign market. It is believed that present production costs in the United States are lower than in Canada (a fact which would tend to encourage shipments from this side), while the value of the Canadian dollar has steadily appreciated, thus overcoming the former effective exchange barrier to American tire trade with Canada.

The Canadian tire market is at present worthy of serious attention, and effort expended there may prove profitable.

The French Tire Market.

By means of a high tariff and exacting import restrictions, France is strenuously endeavoring to reestablish and maintain a more favorable trade balance and build up its home industries. In spite of its 235,000 cars and trucks, France will not likely prove to be an attractive market for American-made tires for several years.

The tariff preference accorded to Canadian-made tires may seem to offer a solution to those American concerns operating factories in Canada, though it is possible that the difference between American and Canadian costs would completely offset this advantage. Some American-made tires will no doubt continue to be sold in France, though the effort could be better spent elsewhere.

It is probable that the French restrictions on tire imports will ultimately

cause the establishment of additional branch factories in France by foreign firms committed to an aggressive foreign trade policy.

Market in Germany.

Although Germany is listed as having some 91,000 cars and trucks, it cannot be regarded as a possibility for the sale of American-made tires. This is because of the rigid import restrictions imposed in a frantic effort to establish a favorable trade balance and the present demoralized German exchange, as well as the uncertain social and political conditions, which cannot be expected to clear up for some time. These same conditions are not only fundamentally opposed to the importation of foreign-made tires into Germany, but preclude the possibility of entering the German market through the medium of branch factories established in that country.

Difficulties in Selling to Australia.

Australia, with its 85,000 cars and trucks, has always seemed to offer attractive possibilities for the sale of American tires, but many markets much smaller than it have taken larger volumes.

The secret is that Australia is definitely opposed to the importation of foreign-made tires. It is that country's desire to build up an adequate home industry through protection accorded by means of a high tariff. This purpose is so pronounced, it is believed, that even if American tires should be able to compete to a large extent and for any great length of time, the Australian government would find some means of overcoming such competition.

Australia's distance from the tire manufacturing countries, as well as its nearness to the sources of raw materials, renders its tire industry unusually secure. On the other hand, Australia's rubber factories will never be called upon to turn out the volume, nor will they probably ever be able to equal the quality or cost of production of American firms.

As Australia's resources have scarcely been tapped and its people are progressive and energetic and enjoy a very comfortable standard of living, it is practically certain that the Australian motor car market will expand with great rapidity in future years, and that among certain classes, American tires will always be preferred because of their quality, in spite of their price.

As the Australian motor car market develops local branch factories will come more and more to be a subject for careful investigation by those American firms committed to an aggressive foreign pro-

gramme.

The Italian Rubber Goods Market.

In a study of the Italian rubber goods market perhaps the most significant points are the highly competitive character of the Italian rubber market, as between many large manufacturers and a number of active agents for foreign producers; the extensive market for high-grade rubber articles, despite the present keen competition, awaiting the advent of lower exchange rates; and the predominance of the Michelin company in fixing tire prices in Italy.

The present demand for automobile tires and its extension in the near future are limited by the following factors: The depression of the lira not only serves to hinder the importation of foreign cars, unless they are afterward sold at lira prices so high as to place them beyond the reach of most Italian purchasers, but it also serves to keep the price of Italian made cars at high levels; no large measure of prosperity is enjoyed by the middle class, which in other countries would naturally provide the bulk of customers for automobiles; the price of gasoline, varying closely with the premium on dollar exchange, makes the operation of an automobile rather costly; the heavy motor horsepower taxes (although in 1922 they are much lower than were the high rates exacted in 1921) place an additional burden on the ownership and operation of a private automobile; and Italian roads have been in a bad state of repair ever since the war, so that their present condition is hard on the machine that travels over them and also detracts from the pleasures of automobile touring.

Tire Competition and Price Fixing.

The business in pneumatic tires is restricted by the conditions mentioned. One Italian agent has estimated the total annual requirements of the country to be 400,000 tires, basing this calculation on an estimate of 50,000 motor cars, each of which is estimated to use two sets or eight tires in the course of a year. To meet this demand there is keen competition between the Italian producers (of which the two most important are the Michelin Company, with its plant at Turin, and Pirelli & Co.) and the foreign manufacturers, mostly American and British, who are represented here.

The Michelin company is declared by a number of persons acquainted with conditions to be the absolute dictator of prices. It is said that all sellers in the Italian tire trade must conform to the quotations set by that company. However, other authorities state that Pirelli & Co. also has a voice in fixing the price

at which tires are sold, but even those who attribute some power of this sort to Pirelli agree that Michelin is most powerful in this regard. Pirelli & Co. gives larger discounts to dealers and is also reported to give an inner tube to each purchaser of a tire.

The dictation of prices on the part of the Michelin company applies only to list quotations. On actual sales discounts vary. Michelin and American agents, who have an established trade, give little credit or, at the most, 30 days. Pirelli and Dunlop, on the other hand, can be persuaded to give as much as three months.

Tire Repair Outfits—Market for Bicycle and Carriage Tires.

There is little knowledge in Italy of such quick tire repair outfits as are widely sold in the United States. One American exporter has lately made a start in sending his tire patches to Italy. Most Italian automobile owners are said to be inconceivably careless in the attention paid to the upkeep of their tires. When they decide to have their tires repaired they usually send them to shops where vulcanizing processes are employed.

Pirelli and Dunlop appear to hold the Italian field in the sale of bicycle tires. The wired-in tire is universally used here as elsewhere in Europe. The American beaded tire is hardly known and would probably not be well received. The wired-in tire used in Italy, selling for 12 or 15 lire, is of a very cheap grade. It is thought that a better quality of wired-in tire can be sold here for about 20 lire (1 lira=\$0.0459 at present exchange).

Solid tires are sold mostly by Pirelli, Hutchinson (considered the best on the local market), Martiny and Dunlop. Motorcycle tires are sold for the most part by Dunlop. Carriage tires are almost entirely furnished by Kelly (English).

Mechanical Rubber Goods—Rubber Footwear and Raincoats.

The market for beltings, washers, etc., is largely in the hands of Italian manufacturers, headed by Pirelli. It does not appear that the market for this line has been developed to its utmost capacity. In a large country like Italy, with a diversified population and industries, there should be a good chance to extend the market.

Rubber boots, ovreshoes, heels and soles under normal exchange conditions would come largely from the United States. The long rainless summers, the prolonged dry weather that often prevails in other seasons, and the mild winters, with practically no snowfall in the more densely populated sections of the country, tend to limit the demand for rubber footwear. Rubber heels are made by many Italian manufacturers of miscellaneous articles.

Raincoats are made for the most part from various grades of waterproof material manufactured in Italy. It is said to be a common practise for Italian manufacturers of these coats to place a stamp on their product which gives the impression that it is made in England.

Demand for Druggists' Rubber Sundries.

One authority on the sale of miscellaneous rubber goods states that the arti-

cles most in demand are nipples, soothers (plain and with bone rings), syringes, hot water bags, rubber sheeting, rubber sponges, bathing caps and ice bags. Italian made articles, largely manufactured by Pirelli, are thought to fall below the standard of American or even German production. However, the Italian products have a wide sale through druggists in the smaller cities and towns and those merchants in the larger cities who cater to second class trade. Rubber sponges are not manufactured in Italy, and under present exchange conditions those offered for sale come mostly from Germany.

American rubber specialties would have a ready sale in Italy if it were not for the high level of dollar exchange, which discourages imports. As it is, the better class of trade is supplied to some extent from the United States, but for the most part from France and Great Britain, although the latter two countries are also handicapped by the premium on their currencies. Slight attempt is apparently made to increase the sales of the better qualities of special rubber articles.

Italian Manufacturers of Rubber Goods.

It is said that out of the 21 rubber companies in Italy the most important are the following:

Societa Italiana Pirelli, Milan—All kinds of rubber products except rubber footwear, including tires, specialties, insulated electrical devices and cables.

Societa per la Fabbricazione dei Prodotti Michelin, Turin—Automobile and bicycle tires.

Societa Industria Gomma & Hutchinson, Milan—Motorcycle and bicycle tires; also mechanical and technical goods.

Societa Bergougnan & Tedeschi, Turin—Tires in general, mechanical and technical goods.

Spiga, Turin—Tires in general, except automobile.

Salga, Turin—Motorcycle and bicycle tires, rubber thread, and mechanical and technical goods.

Societa Walter Martiney, Turin—Solid and cab tires, sanitary and surgical articles, fine sheeting, mechanical and technical goods.

That Italian manufacturing capacity is fully equal to the country's requirements and, moreover, produces a large export surplus, as stated by a representative of Pirelli & Co., may be admitted so far as quantities alone are concerned, with the exception of footwear, but on the score of quality that assertion may be questioned. There is still a market for the higher grades of rubber specialties which Italians do not manufacture, but it must await development until the exchange situation rights itself.

At present rubber exports from Italy should be favored by the depreciated value of the lira, but domestic manufacturers report overproduction and the consequent accumulation of large stocks which cannot be sold at home or abroad. This is attributed to the world-wide depression and the recently increased duties on imports in the other countries.

It should be noted that from 75 to 80 per cent. of Italy's rubber exports consist of tires. If other Italian rubber

products were of better quality and costs of production, with the prices based on them, were kept within reasonable limits, Italian manufacturers should have been able to increase their exports appreciably during the past year or two when lira exchange was so heavily depreciated in terms of the world's principal currencies. That they have not been able to do so is an indication, though not a conclusive proof, perhaps, of certain handicaps imposed upon Italian rubber exports in the way of uncontrolled expenses of production (a condition common to most industries in this country) and a quality which makes only a limited appeal to foreign purchasers. It is rather expected that present prices of rubber products generally will go lower since the tendency just now points that way.

Lack of Traveling Salesmen in Italy.

It seems that the Italian market for rubber goods other than tires could stand a much more intensive development than it has yet undergone, particularly in cases of certain high grade specialties, such as druggists' sundries. Probably the lack of development up to the present is not due to any slackness on the part of rubber manufacturers or representatives of foreign houses now established in Italy, but rather to the fact that competent rubber salesmen are exceedingly scarce in this country. A general representative has considerable difficulty in finding traveling subordinates with the requisite technical knowledge and qualifications to sell on the road.

New Swedish Tax on Rubber Tires.

A new law has recently been enacted in Sweden to be promulgated on Jan. 1, 1923, revising the tax on rubber tires. Rubber tires imported into Sweden will, according to the provisions of the law, be subject to a tax of 1.50 crowns per kilo, to be paid with the duty (1 crown=\$0.26). Rubber tires on automobiles imported into the country are likewise subject to this tax, payable with the duty on the automobile. The tax, however, is not applicable in cases where exemption from custom duties has been granted.

It is further provided that manufacturers of rubber tires in Sweden within a month after the close of every quarter must submit to the government lists of tires sold to users or put into service for the manufacturer's own account.

Arthur Scherbaum, Jr., has accepted a position as tool and die maker for the Eiseman Magneto Corporation, Brooklyn, N. Y.

Erwin L. Schwatt has become associate engineer with the Automotive Engineering Consultants, Philadelphia. He was formerly mechanical engineer for the Vibration Specialty Co., also of Philadelphia.

George A. Schwer has been elected president of the Schwer Engineering Co., Sandusky, O.

E. C. Selman has severed his connection with the Hudson Motor Car Co., Detroit, to return to the Pierce-Arrow Motor Car Co., as European representative. He will be located at 3 Rue Victor Hugo, Levallois-Perrett, (Seine), France.

Gasoline Process Fight

IT IS apparent that a battle between the larger oil companies of the country for control of the patents covering the basic principle of "cracking" heavy oil into gasoline by the application of heat and pressure is brewing in the industry. Several of the Standard Oil units already have taken action to prevent the use without license of the patents they con-

trol by smaller companies, it is stated, and the New Jersey company has recently filed suit against the Pure Oil Company in Columbus, O., but in connection with the suit the company made it clear that it had no intention of keeping the processes for its own use, but was willing to grant licenses to companies making application.

It is pointed out that the fight probably will be carried on by the larger companies, but the question is of such importance that the entire industry is involved and the small independent companies can hardly adopt a disinterested attitude. The question of control of the basic patents covering the "cracking" on hydrocarbon oils has been before the industry for some time, but up to recently it had reached only a controversial stage. The Armour interests some time ago filed suit, backing up the so-called Dubbs patent against the Standard Oil Company of Indiana, controlling the Burton process. Hearings have not yet been assigned. But it has given rise in the industry to such thought as to what the status of the refinery business would be were the courts ever to give exclusive right to one single interest to apply heat and pressure to produce gasoline.

"Some few weeks ago the Standard Oil Company of New Jersey, which previous to that time had not been openly heard from in its patent litigation," says the National Petroleum News, "called attention of refiners generally to patents issued to it as assignee of Carleton Ellis, the particular patent covering cracking being applied for Oct. 4, 1913, and issued May 9 this year. It has been made public that the New Jersey Standard on July 3 filed suit in the United States District Court at Columbus, O., against the Pure Oil Company, claiming that its patent rights are being infringed by the latter company at its plant at Heath, O., and asking an injunction and damages. The petition sets forth that Ellis was the 'first, sole and original inventor of a process for cracking oils under pressure.'"

"Just recently the Standard of Indiana is understood to have sent out blanket notices to independent refiners, calling their attention to the fact that use of cracking processes involving heat and pressure are an infringement of the Burton process, except where license to operate such processes has been granted by the Standard of Indiana. This is being taken as a forerunner to possible definite action by the Standard in what it considers infringements.

HIGHWAY TELEPHONES INSTALLED ON THE LINCOLN WAY.

EMERGENCY telephones on the highway for benefit of vehicle drivers have just been installed, for the first time, it is said, in the United States, on a 15-mile stretch of the Lincoln Highway in York County, Pa. The route is between York and Abbotstown. The telephones have been installed by a Harrisburg company with the approval of the Pennsylvania Highway Department.

The telephone boxes are painted black and white and are attached to telephone poles at one-mile intervals. They are provided with special locks and are available for the use of motorists and others travelling the highway. A nominal sum is charged for a key, which will open all of the boxes.

The arrangement is planned so that a motorist need never walk more than half a mile to communicate with any kind of help needed, such as the nearest garage, doctor, etc. Contracts have been arranged with satisfactory repair stations and garages so that they will answer all calls coming from these boxes day or night.

The company making the installation as a test of its popularity contemplates telephone installations between Harrisburg and Lancaster, and will push the installation along other important roads in Pennsylvania as fast as conditions will permit until the entire state is covered with a network of highway emergency telephones.

"There is a possibility also that the Standard of Indiana may be involved in cracking process litigation from a different source through the announcement made within the last few days from the Pittsburgh office of the Gulf Refining Company of the issuance to it on Aug. 1 of the McAfee patent 1,424,574 for the recovering of gasoline through the use in a refining process of aluminum chloride as a catalyzing agent. Application for this patent was filed Sept. 30, 1913.

"About a year ago, C. O. Hoover, formerly in the research department of the Sinclair Refining Company, announced the discovery of a process bearing his chloride as a catalyzing agent was involved, his process also covering the recovery of the catalyzing agent for use again, patent being applied for. Report from several sources is to the effect that the Indiana Standard has taken over the rights to this process. This has not been officially confirmed, but after being offered for sale this process was taken off the market. It is said that the Indiana Standard is now replacing Burton cracking process units at Whiting with Hoover units."

Possible patent litigation over this latter fact, the paper states, is based purely upon conjecture on the part of the writer.

W. W. Clinedinst, mechanical engineer, has been promoted to engineer in charge of the service department and assistant engineer in charge of the experimental laboratory of Payne Dean, Ltd., New York City, and factory at Springdale, Conn.

Henry W. Allingham was recently appointed joint managing director of Chalmer & Hoyer, Ltd., London.

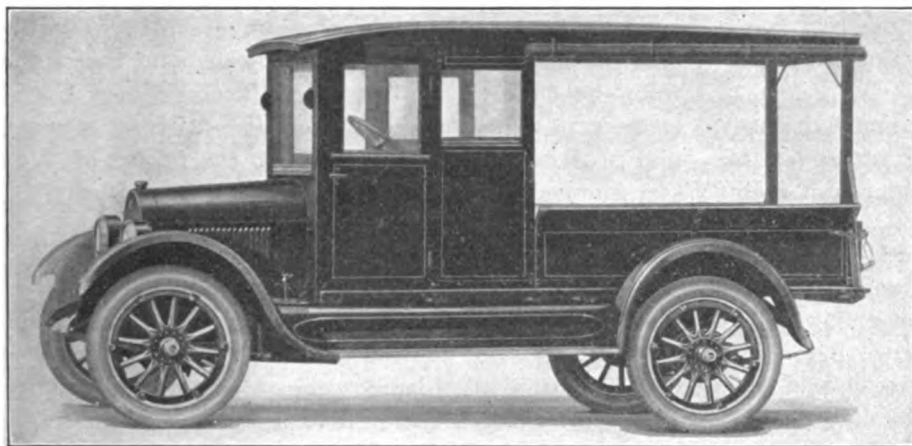
Victor J. Wagoner has been made assistant chief engineer for the Moreland Motor Truck Company, Burbank, Cal.

BUICK 1923 "SPECIAL DELIVERY" LINE

THE Buick 1923 line of Special Delivery cars will consist of six body types on the four-cylinder chassis, and will include many changes in the mechanical construction of the car, as well as an entirely new list of prices.

The models for the next year will comprise an open express body with a cab, which will sell at \$840; a panel

body with a cab to be marketed at \$860; a canopy top with rolled curtains and cab, the price of which is \$855; a canopy top with side screens and cab to sell at \$875; a de luxe panel body with cab to sell at \$960, and a combination passenger and express body with cab to sell at \$935. All the new prices are f. o. b. factories with war tax to be added.



Refinements Noted in the Accompanying Text Should Combine with Prestige to Make Buick's 1923 Line of Delivery Car Popular with the Trade.

THE Buick engineers have not only greatly improved the appearance of the car, but have also incorporated many mechanical changes which will tend to make this delivery job an extremely complete vehicle.

Crowned fenders have been added, together with drum type headlights, a redesigned radiator, which sets much higher, rubber bumpers on the rear axle, special anti-rattle hood

catches, silent over-running generator clutch and a new glass switch face. A transmission speedometer drive, a lengthened gear shift and a transmission lock have also been included in the new models.

Felts have been placed around the valve stems to carry oil to the stems and guides and a new system of generator brushes and brush arms has been used to prevent squeaks.

The easy operating Buick clutch has been further refined and the clutch hub changed from malleable iron to drop forged steel.

The size of the strut and truss rods has been increased and heat treated steel has been used. Another distinct feature of the new delivery models is the brake improvements. Twelve bolts have been used on every wheel hub, giving a separate bolt for each spoke and a much stronger construction.

These models have also been placed in Class "A" in fire insurance ratings. To accomplish this the Buick engineers installed a drip bowl under the carburetor, extra clips on gasoline lines and tail lamp wires and the use of flexible steel coverings on three wires leading from the generator to the switch. The rounding of corners on all covers for wires also was taken care of. The transmission lock equipment, likewise, lowers the theft insurance rate.

SEEK FOREIGN MARKETS

A growing interest in foreign trade, incident with the constant expansion of automotive exports during the current year, is reflected in the correspondence of the Automotive Division of the Department of Commerce.

Mr. Hoepli, acting chief of the division, in an article on foreign automotive markets in the current issue of Commerce Reports, says that not only has a constantly increasing number of automotive manufacturers established connections in foreign countries, but that those who were already in the field are making strong efforts to expand their foreign business. This trend is particularly noticeable among manufacturers of automotive parts, accessories and service equipment, most of whom have only occasionally engaged in foreign trade.

Faulty Export Practises.

With the increasing export activity, the shortcoming in foreign trade methods

of automotive manufacturers become more apparent asserts Mr. Hoepli, and their unfavorable results threaten to impair American good will abroad.

Replies to a foreign trade opportunity communicated to American Automotive Exporters through the automotive division revealed that failures in exporting are largely accounted for by faulty approach of the foreign buyer:

(a) One-third of the replies were written in an unmistakable tone of condescension—as if the American firms soliciting business were conveying a favor to the foreign inquirer. This method of approach is particularly out of place in Latin countries.

(b) One-third of the solicitations, while not containing any information as to the standing, size and activities of the concern making the offer, stressed the fact that they had been in business for a number of years, whereby it was assumed

that the prospect in the foreign country did either know all about the American manufacturer or would go to the trouble of securing the necessary data.

(c) One-third of the offers did not contain any information whatever concerning the American firm from which they originated—except in catalogues sent under separate cover.

(d) One-seventh of the letters of solicitations did inform the inquirer of the goods that were offered.

(e) While the foreign inquirers requested c. i. f. quotations, sea port (well known in the world trade), one-fifth of the American manufacturers only were able to give the desired quotations, while an equal number of firms did not quote any prices at all.

(f) Less than one-fourth of all offers only made mention of letters of credit as a method of payment.

Why Doesn't Somebody Do Something? Well Somebody Does in Webster County, Ia. He's the Real "Do It Now" Type of Engineer.

PARSONS kept the snow off the main roads during the winter and in the spring when "Something needed to be done," Parsons was right on the job and "done something." He is the real "do it now" type of engineer, says District Engineer Reynolds of Iowa.

Parsons is J. L. Parsons, Webster county engineer, who is making rather an outstanding record on his maintenance work in his county. His long suit seems

to consist chiefly in being everlastingly and—mark this point—promptly on the job where something needs "fixin'" and "fixin' it now." Apparently he does not wait for bad spots to become impassable or so bad that the people come en masse and demand that something be done. This county engineer believes that it is the prime business of himself and his road crews to give a satisfactory road surface to the people of Webster county all times and all seasons of the year.

TO DO it promptly and on their own initiative and not simply to sit on the job ready "to do something" when an irate citizen demands that "something be done." When soft spots appear in the road surface or when a bad spot needs tiling, Webster county road maintenance crews are instructed to get on the job and do the work at once if it is possible to do so.

During the winter Parsons and his road crews made a determined effort to keep the Webster county main roads clear of snow. This was done primarily with the thought in mind of keeping the road open and serviceable at the time, but rather unexpectedly it was found this spring that keeping the snow off the highways in the winter was worth half a dozen or more tractor blade graders for maintenance work during the spring break up. District Engineer J. F. Reynolds of Storm Lake, in a recent letter to the State Highway Commissioner, tells what unexpectedly good results this spring followed the snow removal work on Parsons' Webster county roads last fall and winter. Mr. Reynolds' letter in telling of this work on Webster county roads, incidentally puts Engineer Parsons in the "do it now" class of county engineers. His letter is as follows:

"Webster County, situated in the north central part of Iowa, is located in that part of the state where it is possible to get local gravel for the construction of roads in such quantities that the cost of this ma-

terial is not excessive. Webster County has a primary system of approximately 76.6 miles of which a large part has been surfaced with gravel, and is one of the counties in the state that is able to secure excellent results in road maintenance due to an excellent patrol system primarily and to immediate special case maintenance in the form of snow removal and quick repairs on bad spots as soon as they start to show up.

"The equipment used in ordinary maintenance consists of Pierce-Arrow, FWD, Nash Quad and Packard trucks used to pull Engle, Duplex and Adams maintainers.

"John L. Parsons, county engineer, has complete charge of primary road maintenance in Webster County and has so arranged his patrol districts that each truck and heavy maintainer does not have to exceed 20 miles of road. Where it is possible Mr. Parsons has so arranged the patrol districts as to give each heavy outfit part gravel and part earth roads. This then makes it possible for the maintainers to go over the gravel roads immediately after a rain or while it is still raining and take care of the earth roads the second day.

"There is only one short stretch of road that is still being maintained by hiring a dragger. Webster County has concluded that they can get more efficient and economical maintenance by employing full time patrolmen and the excellent roads in Webster County this year did

seem to verify the truth of this assumption.

"At such times as their maintainer outfits are not actually dragging or blading the roads the patrolmen spend their time repairing bridges, cleaning ditches, opening tile intakes and such work. At present it is found that they are able to put approximately 10 per cent. of their entire time to hauling maintenance gravel. This complete maintenance organization is comparatively new and in getting started find many things to do on the road that should have been done in the past. After they get caught up with this work they expect to be able to haul maintenance gravel about 25 per cent. of the time.

"One of the things that contributed to the good roads in Webster County this year was the fact that the snow was removed from the road during the winter. This was always done just as soon as possible after it fell. For this snow removal Mr. Parsons used a Duplex maintainer and an FWD truck, teams and six-foot graders, Pierce-Arrow and six-foot grader, and in those cases where this equipment could not remove the snow a gang of men was put to work shoveling the snow from the surface of the road. One very efficient result of this snow removal was the rapidity with which the surface of the road dried out as soon as we had sunshine and thawing weather in the spring. Usually the warmth of our first spring thaw melts part of the snow on the sur-

face of the road and melts this snow at such rate that the surface is water soaked for several days. By removing the snow the surface of the road was the first to dry out.

"One new gravel road broke up in three or four cuts and threatened to become impassable. This was due to this road not being thoroughly compacted before it froze and due to insufficient surface drainage. Without waiting for users of this road to report it to everybody connected with highway work from the patrolman to the State Highway Commission, Mr. Parsons immediately got busy and put in tile through these bad places and hauled in new gravel and the result was that this road was passable at all times.

"One new earth road broke up in several places and these were also taken care of very promptly. In one case it was necessary to plank the road for some distance but this was promptly done and the result was that traffic was at no time held up. The outstanding features in Webster County's maintenance is the fact that the snow was removed in the winter and that when any bad places developed in the road Mr. Parsons always 'done something.' The people in Webster County could not make the old familiar statement 'why don't somebody do something.'"—Iowa State Highway Commission, Service Bulletin.

Would Minimize Theft of Cars

IT IS recognized generally that one of the most effective ways of identifying stolen trucks and cars and minimizing the danger of their being stolen would be the adoption of a method of numbering engines and frames, which would make it impossible to change the numbers without leaving indications that such a change had been made.

AT THE present time stamping plain characters on several parts of the engine and other units of the chassis seems to be the most satisfactory way of guarding against having numbers changed by auto-

mobile thieves. Several automobile companies are now using this method. It is realized, however, that if a simple means of numbering iron or aluminum castings can be developed which will make it impossible for the numbers to be changed or leave indications that they have been changed, it will be a real solution of this important problem.

The National Automobile Underwriters' Conference submitted to the National Automobile Chamber of Commerce an offer of a 20 per cent. reduction in automobile theft rates provided satisfactory methods of numbering engines and frames should be perfected. This offer in turn was submitted by Charles Clifton, president of the National Chamber of Commerce, to the Society of Automotive Engineers.



"WHO'S the lucky buyer?" I asked O. M. Vett as I came into his office and found him gazing pridefully at a recently signed contract. "Some one of your many high class customers I suppose."

Vett nodded. "'High class' is the only kind I have," he laughed. "This particular one happens to be one of my farmer friends, a class of the best buyers in the world and the best owners too because they've got intelligence enough to recognize the truck as an investment and as a consequence treat it as such."

"The farmers down my way wouldn't buy many trucks," I said. "They might now, but in the old days they'd have been poor customers because they didn't have the money to buy with. Things have changed in all probability, but still I never thought the farmer made as much as the ordinary worker."

Vett laughed. "That's some more of your colossal ignorance," he said. "I always wondered how you got by in the writing game—you're always displaying such unusual and unmitigated lack of knowledge." He paused, searching through his desk. "Here's the paper I was looking for—one of the latest income tax compilations that has been issued. Got it yesterday. How much do you think for instance the farmers of the Pacific states averaged for a year's income—I don't mean the occasional farmer, but the actual average taking in all agriculturists?"

Always willing to hazard a guess on anything and everything I promptly said that these farmers might have averaged \$1500 though I thought the figure was high.

Vett nodded. "Yes," he said, "they averaged that all right—about twice that to tell the truth."

"How much do you think the farmers in California averaged?" he asked, gazing at me over the top of his glasses in a stern manner.

"Probably a couple of thousands," I answered.

"Yes," said Vett—"probably' is right and then some—'cause they averaged pretty near twice that. And so the story goes. I'll ask you more questions to see what you actually know about your own people. Which makes the most money in the year—the average 'gainfully employed' or the average farmer—take 'em as a class. I mean average when I say average too—take in all the one-acre farmers in the South and tiniest market farmer in New England."

"That doesn't seem very hard," I said. "I still think that the 'gainfully employed' has the larger income—it stands to reason they must have—if my judgment is any good."

"Your judgment is rotten then," said Vet, "because these statistics I have in my hand show that the farmer made the most money by quite an amount," and as proof he pointed to the figures on the paper which he held in his hand. "Now you see why the farmer is a good prospect and why I sell 'em trucks."

JULY NEAR A RECORD

EARLY reports from the automobile industry throughout the United States indicate that the sales for July will be near a record, as compared with the same period of previous years. Although the trade generally is affected by a mid-summer languidness in July, the unusually large call for cars and trucks this year has kept the automobile manufactur-

ers exceptionally busy. The expected lull occurred in but few sections and practically none of the larger cities was affected says Hill.

While it was not hoped that the month would equal the phenomenal output of June, which has been given as 288,000 cars and trucks, it is believed now that the July output will be well above the 200,000 point.

ACCORDING to the dealers there has been a heavy call for light commercial motors throughout the agricultural districts. Parts makers as a unit declare that the volume of trade has shown no decline.

"Better than normal" is the general trend of the business reports received by the Automobile Chamber of Commerce from dealers in the metropolitan district. The slight slackening of trade seems to have been felt only by used car dealers, according to the early returns on the industrial conditions.

With the reports of big increase in closed car business for fall delivery, interest is centering in the closed car show, which will be held in the Grand Central Palace, Sept. 23 to 30. It is the aim of those in charge to make "convenience to the public" their motto and carry it out in full. The basic principle of the general store will be adopted, so that those who view the exhibits may pick out whatever suits their fancy.

The main show committee is as follows: Charles H. Larson, chairman; Harry W. Gaston, vice chair-

man; Harry S. Haupt, Hugh T. Porter, Lee J. Eastman, William C. Poertner and Eugene P. Herman. The management of the affair will, it is announced, be carried out by T. F. Moore.

CHANGE IN NAME IS VOTED BY COMMITTEE.

WASHINGTON, D. C., Aug. 12.—For the sake of simplicity and euphony, members of the Highway and Highway Transport Education Committee have voted by referendum to change its name to the Highway Education Board, it was announced here.

No change in the personnel of the board, nor in its functions, is contemplated, it was said. Dr. Tigert, who is United States Commissioner of Education, remains as chairman, while members of the board, as of the committee, continue to represent their respective organizations. Thomas H. MacDonald, chief of the Bureau of Public Roads, represents the Department of Agriculture. Colonel F. C. Boggs, Corps of Engineers, United States Army, represents the War Department. The National Automobile Chamber of Commerce is represented by Roy D. Chapin, president of a Detroit automobile company, while H. S. Firestone, president of an Akron tire company, is the delegate from the Rubber Association of America, being industry's other representative. The technical societies balance out the committee with Dean F. L. Bishop, School of Engineering, University of Pittsburgh, from the Society for the Promotion of Engineering Education and H. W. Alden, Detroit parts maker, from the Society of Automotive Engineers.

246,600 CARS AND TRUCKS, RECORD JULY PRODUCTION.

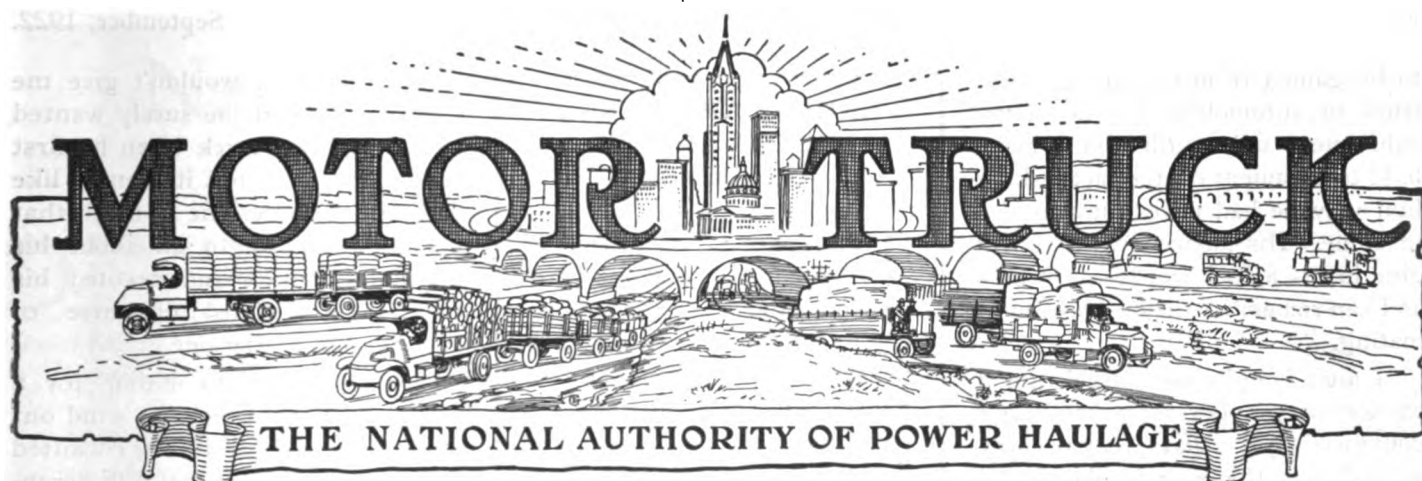
Figure Based on Shipping Reports. Third Largest Single Month's Output. Exceeds Same Month of 1921 by 39 Per Cent. and Best Previous July by 20 Per Cent. Shows a Seasonal Decline of 14 Per Cent. from June, the Record Month.

Shipping reports to the National Automobile Chamber of Commerce, 90 per cent. complete, indicate that July shipments from all factories will reach a total of 28,412 carloads, 28,022 driveaways and 6855 boat. On this basis it is estimated that 246,600 passenger cars and trucks were produced by all makers in July, exceeding July, 1921, by 39 per cent., and the best previous July (in 1920) by 20 per cent. The decrease under June, of 14 per cent., is seasonal, and expected. This is a record for production in July and is the third largest single month's production in the history of the industry, being exceeded only by the two preceding months.

The factory shipping figures for all manufacturers are:

	Carloads		Driveaways		Boat	
	1922	1921	1922	1921	1922	1921
January ...	15,357	6,485	7,479	3,185	143	93
February ..	19,636	9,986	10,173	7,507	180	99
March	27,753	16,287	16,917	9,939	560	75
April	31,334	20,187	22,381	14,197	2,960	1,619
May	33,416	18,608	28,827	15,193	7,406	2,381
June	34,230	20,269	33,857	18,834	7,737	3,947
July	*28,412	19,514	*28,022	15,533	*6,855	3,726

*July, 1922, partly estimated.



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PAWTUCKET, R. I.

SEPTEMBER, 1922.

"Every Knock Is a Boost" Is Poor Selling Logic

"Every Boost Is a Boost," Is the Way the Wise Motor Truck Salesman Puts It and He Has the Right Idea; Read the Following Story and See Why

(By S. G. SWIFT.)

I MET him on one of my long Sunday drives: About 45, tall and broad shouldered; a husky type of modern farmer. He owns a fairly large farm which is given over principally to raising white corn that is made into a superior brand of Indian meal in an old-fashioned mill with a big over-shot wheel.

This man, who cultivates 70 acres, aside from his hay lands, has every appearance of being progressive: house, barn and outbuildings are lighted with electricity from a farm power plant; the most modern methods of separating and keeping milk, of which he sells about 150

quarts a day, are used; cows and horses are kept in a well ventilated

barn; running water is piped to the house, which contains a modern bath

room, and fresh water is supplied to the stock through a series of sanitary drinking vessels. Yet despite all these evidences of a belief in present day conveniences—the man hasn't a motor truck or an automobile.

There is good reason to believe that he will have both before another spring, but thus far he has owned neither and says that he doesn't "know the cabaretter from the horsepower." It seemed passing strange to me that this prosperous citizen with his obviously advanced ideas should have failed to see the marked advantages



If You Can't Sell Your Own Truck to the Prospect Just Sell Him the Industry. Don't Be a Knocker; Boosting Is Easier and It Pays Better.

to be gained from owning a motor truck or automobile. In one of my subsequent talks with him I made bold to comment on the fact, asking him why he had never purchased a machine. His answer, which I will give in his actual words—as nearly as I can remember them—was illuminating.

"I ain't bought me a truck nor a car for the simple reason that I ain't convinced yet that they're any good," was the way in which he started. "Some of the few people in this neighborhood—perhaps five—use them and seem to get good satisfaction from them, but I have had pretty good proof that they're not what they might be; men who ought to know—bein' in the business—have knocked 'em so hard I just ain't satisfied that I want to buy."

"What 'men in the business' have knocked them?" I asked incredulously. "What men—and what business?"

"Fellows in the motor truck and automobile business," nodded the farmer. "I mean just what I say—men engaged in the sellin' of cars and trucks—workin' at it every day, though how in time they can make much of a livin' at it is more than I can conceive, since in order for a fellow to succeed he'd ought to have some belief in the article he is sellin'," he finished, evidently relishing my mystification.

Again I asked him to explain his seemingly ambiguous remark.

"What I meant by saying that they had prejudiced me against the entire idea of having motor trucks or cars was a fact," laughed the farmer, somehow embarrassedly. "It seems foolish for me to say it and I know it'll sound funny to you—it does to me in a sense. But I live so far out of the way that I haven't been much in touch with automobiles or trucks and as a result was slow to imbibe the idea of makin' a purchase, although I presume I would have long ago if the fellow I mentioned hadn't happened along to delay me from buyin'. But here's the way they done it to answer your question specific.

"About a year ago I had planned

FARMERS APPARENTLY PREFER LIGHTER TRUCKS.

THE great majority of American farmers prefer light trucks for their delivery and hauling work, as evidenced from a compilation of figures by the statistical department of the Republic Truck Sales Corporation, Alma, Mich.

Forty-one per cent. of the trucks in use on American farms today are rated in the $\frac{3}{4}$ -1-ton class, 18 per cent. are $1\frac{1}{2}$ -ton, 28 per cent. two-ton, four per cent. are three-ton, and nine per cent. are miscellaneous sizes.

Republic truck sales for the past three years, parallel the average of the United States, the percentage of sales of various models to farmers being approximately the same as the figures given above.

on buying a 'Wilgo' truck. I never saw one and merely read the advertisement of them in one of the three farm papers I find time to read. The specifications, from what I know of machinery, seemed to me about right; the capacity, if the advertisement wasn't lyin', suited me all right and I felt that the first cost wouldn't break me. So I wrote to the factory and they sent me a representative. He talked pretty straight so I thought the machine was a pretty good buy and had about decided to arrange its purchase. But before I could get around to it along comes a fellow from the 'Autogo' truck people. He talked pretty straight too—until I happened to mention the Wilgo truck to him. Well, sir, it was just like waving a red rag in the face of a Hereford bull; the fellow started in to pan out the other truck for further orders. He said it was too expensive to run, had too heavy an engine for the size of the machine, was hard on the rubber and then wound up by telling me that because it was a 'spe-

cialized' truck it wouldn't give me service. Yes, sir, he surely wanted to sell his own truck when he first landed out here, but it seemed like he hated the other one so much that he absolutely forgot all about his original intention and devoted his time to a detailed discourse of knocks on the other one.

"Well I didn't do nothin' for a while—he'd kinda took the wind out of my sails so to speak and I wanted to wait until I saw the Wilgo representative again on the following Saturday to kinda check up on what the second salesman had said. So when he come I told him that I had another demonstration and what the Autogo fellow had said about the merits of his truck, not forgettin' to mention what he had said about the Wilgo truck because, of course, I wanted to get all the information I could. It was a funng thing—that Wilgo salesman who had been such a fine fellow to talk with on his first visit started in to pan out the Autogo truck even worse than the Autogo salesman had panned out the Wilgo truck. Yes, sir, it was a circus; he said the Autogo was hard on oil, couldn't pull any more than a flaxseed poultice, was a gas hog of the highest order that wouldn't do more than two rods to the gallon and wound up by saying that because it was all built in one factory and not made of specialized parts it couldn't be any good. To tell the truth I was more puzzled by this time than ever and didn't know exactly what to think, but was sort of forced to believe that at least one of these two men was lyin' to me, though p'raps I was wrong. At any rate I didn't plan to buy either one of the trucks and actually figured I'd wait a year or so 'til they got to makin' 'em better.

"Seems like when a man is in a market for a truck that the wind carries the news, for the next day bright and early along comes a big, tall, skinny fellow selling the 'Cango' truck and wanted to give me a demonstration, bein' if anything more demonstrative, as one might say, than either of the other two.

(Continued on Page 494.)

National Safety Council Meets

(Special Letter to Motor Truck.)

DETROIT, Sept. 9.—Telegrams heartily indorsing the public and industrial safety movement and offering commendation for results already obtained were received from President Warren G. Harding and Premier W. L. MacKenzie King of Canada, at the opening of the 11th annual safety congress of the National Safety Council held here recently.

President Harding's message read before the 3000 safety delegates was as follows:

Insistent demands of public duties make it impossible for me to accept your generous invitation to attend your national convention. I want to assure you, however, of my deep interest in your work and in the cause which brought your council into existence. Anyone at all familiar with its purposes must recognize in the National Safety Council a powerful agency for correcting a widespread evil. What it has already accomplished toward prevention of accidents, and what it is undertaking to do to extend this excellent work throughout the country, clearly establish the need and value of the organization. Accident prevention cannot be left to legislation alone. Federal, state and local governments have set up safeguards, but these are not enough. I believe that extensive education, and intensive practise under definite rules and regulations, will accomplish very much of benefit. I think your council can confidently anticipate a great usefulness in this respect, which will be reflected in a great reduction of the toll which carelessness takes of the nation each year. I am glad to record my indorsement of your effort and to be enlisted in the cause of safety.

(Signed)

WARREN G. HARDING.

Premier King in his telegram said:

Deeply regretting that official duties prevent my attendance, I send cordial greetings to the International Safety Congress.

May your deliberations lead you on to still higher aspiration and still nobler achievement in a cause that means much to the well-being and happiness of the people of both our countries.

(Signed)

W. L. MACKENZIE KING,
Prime Minister.

Arthur H. Young of the International Harvester Company, president of the council, in his annual address made special reference to the comprehensive public safety programme of the council and announced that a large sum of money had been made available by a group of insurance companies to aid the council in its campaign against automobile accidents. He placed particular emphasis on the value of this practical cooperation in as being a significant era in the progress of general accident prevention. He paid a tribute to the railroads in their careful crossing campaign and to the hundreds of local safety organizations doing safety work in many cities throughout the country. He prophesied that in time all preventable accidents will be prevented and that the people of the United States will take a jealous and watchful care of their lives and limbs as they now do of their dollars earned, saved and invested through fixed and ingrained habits of safety. He said in conclusion:

"War, pestilence and famine may take their occasional toll of humanity, but I dare to look forward to the time, a long time this side of the millennium, when, by virtue of what is now being done in this nation and others, the fourth dread horseman, whose name is accident, shall ride no more—when the crimson record of

human carelessness and needless, useless waste of human life and limb shall have been bleached white."

The congress adopted a resolution indorsing a safety platform for 1923 as follows:

Whereas, the 80,000 accidental deaths and millions of injuries occurring each year on our streets, in our industries, in homes and elsewhere are a blot on American civilization and the cause of untold suffering and sorrow, and

Whereas, the direct economic cost of industrial accidents alone exceeds one billion dollars annually, and

Whereas, experience has demonstrated that at least 75 per cent. of industrial accidents are preventable and that approximately an equal reduction is possible as regards public accidents, therefore be it

Resolved, that the National Safety Council in its Eleventh Annual Congress in Detroit assembled advocates:

1. The safeguarding of all dangerous machinery and places according to standard methods of proved value.

2. The development of industrial equipment and processes along lines of inherent safety for the double purpose of eliminating accident hazards and increasing production efficiency.

3. The education of all workmen and their supervision in safe methods and habits of work.

4. The training in safety of all school children, as well as students in colleges and universities, both for their own protection and as an object lesson in good citizenship.

(Continued on Page 476.)

Acme Accomplishes Big Job

"So You Want a Town Moved, Do You?" Nonchalantly Asked President W. A. Kysor of the Acme Motor Truck Company of Cadillac, Mich. "That Isn't Going to Be So Hard as It Appears," He Said and Designed a Trailer That Does the Work Easily.



The Houses to Be Moved Varied in Size from 24x30 to 24x40. They Were Most of Them a Story-and-a-Half and Because of Their Design Were Heavy and Cumbersome but the Trailer to Handle Them Was Soon Built and the Hard Job Easily Accomplished.

THE developments of the past 10 years in the automotive industry are almost startling, when one calmly reviews them. Tasks that a few years ago would have been called impossible have been successfully accomplished by the truck and trailer. Practically everything movable has been moved and almost daily we hear of some new triumph of automotive engineering.

THIS is the story of one such accomplishment.

The Acme Motor Truck Company of Cadillac, Mich., has just built a trailer of unusual design that is being used in a unique and unusual job—moving practically the entire town of Jennings to Cadillac, a distance of 11 miles.

This village, 11 miles north and east of Cadillac, was founded about a quarter of a century ago by the Mitchell Brothers Lumber Company. A saw mill, chemical and flooring plant, gave employment to approximately 500 men.

Various plans were considered for the preservation of the industrial life of the happy and contented little village, but all were discarded. Then was born the idea of moving the mills, the families and the resi-

dences to Cadillac, 11 miles southwest. Many plans were considered and rejected as impractical before the motor truck and trailer were considered. Acme engineers studied the problem from every angle, then finally W. A. Kysor, president of the Acme Motor Truck Company, submitted a report to the lumber company which was accepted and the gigantic trailer illustrated in connection with this article was built. It was such a large size that it had to be built out of doors.

The houses to be moved vary in size from 24x30 feet to 24x40 feet. Many of them have hardwood floors, all are a story and a half high, well built, comfortable and arranged for convenience. The weight of the houses varies from 15 to 35 tons. The windows are left in all of them. So perfectly does the trailer function that there is not the slightest jar in any part of the journey and not a window has been even cracked, except in passing through the City of Cadillac, when the limbs of shade trees along the street broke one or two when the first house was brought in.

The 11-mile trip is made in about four hours, which includes all necessary stops to wait for traffic to pass before entering upon a stretch of

road too narrow to allow passing, though the actual running speed is from five to eight miles per hour. Loading and unloading and passing through the city requires a longer time than that, as it is often necessary to remove the electric light and telephone wires to allow the house to pass under.

At the time this article was written the rate of moving is about two houses every three days or four per week, although as the crew grows more accustomed to the work it is thought a house a day will be brought over. There are from 75 to 100 of these residences to be moved, so the work will require the rest of the year to complete.

The trailer is constructed with a frame work of heavy structural steel beams. A channel and I-beam platform, raised 18 inches above the trailer frame and rigidly connected to it, transfers the load at the forward end of the trailer to a rocking fifth wheel mounted on the truck. This construction eliminates all twisting stresses from the trailer proper.

The trailer frame is supported at the rear by four steel truck wheels abreast, equipped with solid rubber tires. These steel wheels are placed under the trailer in such a position

that approximately 75 per cent. of the weight of the trailer and load is carried on them, thus making it possible to carry a very heavy load on the trailer without overloading the truck used for motive power.

The trailer is designed safely to carry a maximum uniformly distributed load of 35 tons, and the complete unit weighs approximately five tons.

Frame—The trailer proper is 24 feet wide by 42 feet long. It consists of five longitudinal members of heavy section structural steel, securely held in place by two main and four supplementary transverse beams. Diagonal cross braces are built into the frame to distribute the stresses where excessive weaving and twisting would occur. To give added rigidity and strength to the structure the three center longitudinal members are reinforced with large truss rods securely anchored to the member at each end and supported at equal intervals by cast iron struts. The tension in these rods is equalized by a series of turnbuckles. All frame connections, gussets, braces, etc., are hot riveted, the entire frame reflecting the skill of the builders.

Front Support—The platform at the forward end of the frame is raised 18 inches above the trailer. It is constructed of channels, I-beams and plates, and substantially braced with diagonal members to the forward transverse member of the trailer proper in order to elimin-

AUTOMOBILE EXPORTS CONTINUE TO INCREASE.

EXPORTS of passenger cars in June increased 15 per cent. over those of May, which in turn had gained 5½ per cent. over the previous month. Truck exports gained 36 per cent. in May over the preceding month, but fell off slightly during June.

ate side sway. This platform is connected to the trailer frame by means of heavy gusset plates and channels of sufficient strength to safely transfer approximately 25 per cent. of the weight of the trailer and load to the rocking fifth wheel mounted on the truck.

Running Gear—At the rear the trailer is carried on four cast steel truck wheels, all abreast, equipped with 40x6 dual truck tires. The wheels are arranged in pairs, each wheel operating on tapered roller bearings supported by a tubular steel axle shaft. The shafts of each pair of wheels are bolted together at the center through a large steel casting which is supported by an extra heavy wrought iron pipe extending through it and at right angles to the shaft. Heavy steel pillow blocks at either end of this pipe support the weight of the trailer and load through coil springs, attached to the trailer frame. This unique construc-

tion not only cushions the load, but successfully provides for road inequalities which is very essential when taking into consideration that the distance between the outside wheels is approximately 11 feet.

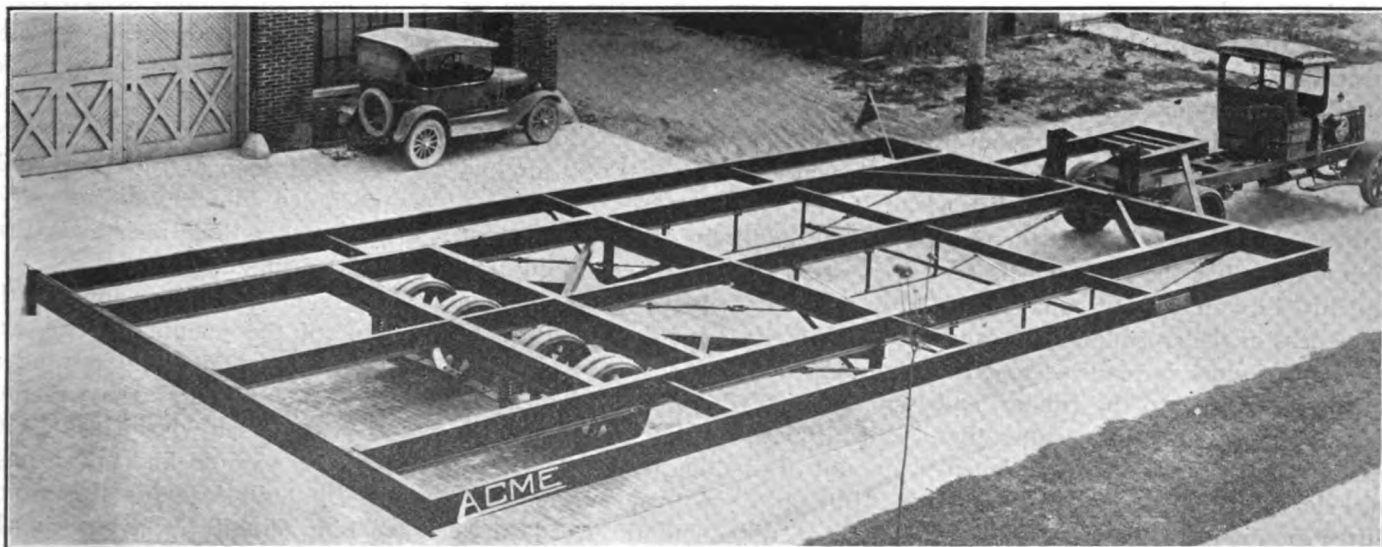
To relieve the springs from driving stresses a radius rod with flexible connections is provided for both sets of wheels, the forward end of which is secured rigidly to the trailer frame and the rear end fastened to the end of the wrought iron pipe through a swivel connection.

In order to maintain perfect alignment of all four wheels the wrought iron pipes supporting the axle shafts are tied together by a system of flat bars secured to the trailer frame and so arranged as to compensate for spring deflection.

The distance from the top of the trailer frame to the ground is approximately 40 per cent. when the trailer is loaded.

Method of Loading—The house is raised by a series of jacks located at each side. The two outside longitudinal members of the trailer, which are bolted on, are removed. The trailer is then backed under the building and the house is lowered until it rests evenly on the trailer frame. The side members are replaced if it is found necessary, and the unit is ready for its journey.

Motive Power—Our model 125 chassis is furnished with this trailer. It is equipped with a Continental motor, which develops 55 H. P.



By Comparing the Automobile in the Background with This Enormous Trailer One Gets a Good Idea of Its Mammoth Proportions. Drawn by an Acme 125 Chassis It Easily Transports Large Dwelling Houses.

The Cost of Traction

“WE ALL realize that a human life, a car, or even a fender is worth considerably more than a gallon or so of gasoline,” says H. W. Slauson, M. E., engineering service manager, Kelly-Springfield Tire Company. “Certain, positive traction is needed on every motor vehicle in order to run it not only safe, but efficient,” states Mr. Slauson.

“The action of rubber on the average road surface offers a sufficiently high coefficient of friction to furnish ample traction in dry weather. But allow a small amount of water to cover this same road surface and the coefficient of friction is reduced to zero, in some instances, and we have a lack of traction which produces the disastrous skidding or the inefficient wheel spinning.

CHAINS have always been looked upon as the safest and surest means of obtaining traction, and any car or truck driver who would use smooth tread tires in wet weather without attaching chains not only endangers his own life, but that of other road users as well.

“But often the coefficient of friction of the hard steel of the chain cross links on a wet roadway may prove insufficient, and in consequence the clutch and brakes should be handled with the greatest of care in wet weather even though chains are employed.

“Chains always have been looked upon as a necessary evil, and the difficulty of attaching and removing them induces too many drivers to travel too long without them and then to leave them in place for an appreciable time after the roadway has become thoroughly dry. This injures not only the tire, but the chains themselves, for the continual action of the cross links on the hard dry pavements will wear even the toughest steel.

“But the use of chains when not necessary is even more costly from another standpoint, and that is the fuel waste which occurs whenever vehicles are driven with chains in place. Work is required to lift a car over each cross link. If the tires are so soft that the rear wheels are not lifted by an amount equal to the thickness of the cross links the same amount of work is required to push the cross links into the rubber, and consequently we may assume that during each wheel revolution the entire load carried by that wheel is lifted an amount equal to the height of cross links surrounding chains.

“At 20 miles an hour there will be approximately 220 wheel turns on a 30x3½-inch tire, and if each rear tire is loaded to its capacity of 600 pounds, we find that the actual work required to lift the rear wheels over these cross links at the speed in question will be 2.66 horsepower. If we assume that the transmission and differential are 80 per cent. efficient, we find that the engine must develop 3.32 more horsepower at 20 miles per hour speed than would be the case were chains not employed on the tires. This waste power will cost the car owner 13 cents per hour in the form of unnecessarily consumed gasoline.

“Applying the same figures to the fully loaded 32x4 inch tire we will find that a total horsepower of 4.8 is required to drive a car so equipped at 20 miles per hour when provided with chains. This makes the chains cost 18 cents an hour on tires of this size. Thirty-two by 4½-inch tires when fully loaded will require 7.05 extra horsepower if provided with chains, at a cost of 29.3 cents an hour, while the sedan or heavy touring car using the 33x5-inch tire will require 9.5 additional horsepower to turn the rear wheels at 20 miles an hour if provided with chains, at a total excess cost for fuel of 36 cents an hour.

“Such additions to motoring cost may seem surprising, especially if it is necessary to employ chains throughout a long run of 10 or 12 hours. In fact, it may be safely assumed that wheels using chains will add at least 15 per cent. to the amount of gasoline required.

“But on a six or seven-ton truck provided with smooth tread tires which require the use of four one-

inch chains, the power wasted is even more astonishing. Such a truck, if driven at 12 miles an hour, will require 30.6 additional horsepower to revolve the rear wheels when provided with chains. At a cost of 30 cents a gallon for fuel, this additional power required by the chains will represent an outlay of approximately \$1.15 per hour, or \$11.50 for every 10-hour day when the truck is driven under these conditions.

“With the summer time sprinkling of city streets the frequent rains in many parts of the country and the melting snow and ice which leave our roads wet throughout a large part of the year, we can conservatively assume that safety would require non-skid devices at least 20 per cent. of our driving time. Therefore, if the above-mentioned truck is driven 300 days a year at an average of 100 miles per day, we would find the approximate additional cost for gasoline to supply the extra power necessary when chains are used to be \$345 per year. This \$345 represents an amount which could be saved by any properly designed non-skid truck tire possessing traction over all kinds of pavements without the necessity for the use of chains. Such a truck tire could be designed which will not offer any greater rolling resistance than smooth tread solid tires.

“The same conditions apply to the design of the pneumatic tire, and while the saving would not be as great, nevertheless the average heavy car owner who drives 10,000 miles a year would find that a positive grip built into his tire would save him actually 36 a year in the item of fuel alone.”

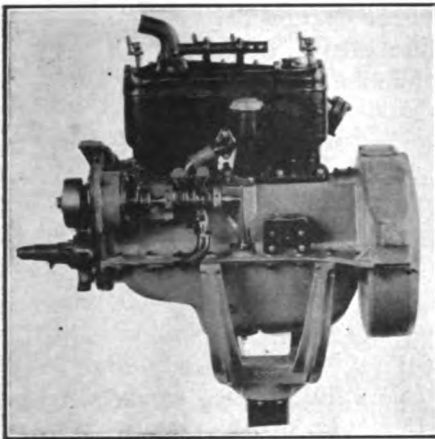
Announce New Atlas Models

THE Industrial Motors Corporation merged the Atlas Truck Corporation, York, Pa., and Selden Truck Corporation, Rochester, N. Y. The Atlas speed trucks manufactured by the former are now distributed by the Selden Truck Corporation. The Atlas line consists of two speed and truck models: "The Merchants' Dispatch" model 22, rated at one ton and model 44 rated at 1½-2 tons. Both models are equipped with the Buda "M" motor, 3¾ inches by 5⅞ inches; worm drive rear axle and transmission of own manufacture.

THE complete specifications of these two new models as announced by the Selden Truck Corporation are as follows:

MODEL 22.

Carrying Capacity—One ton.
Wheelbase—130 inches.



Buda W. T. U. Engine of Atlas Light Truck, the Merchants' Dispatch.

Wheels—Wood.

Tires—Pneumatic cord tires, standard, 34 by 4½ inches front, 34 by 4½ inches rear. Under no circumstances will solid tires be furnished.

Motor and Motor Trim—Location, under hood. No. cylinders, four. Bore and stroke, 3¾ by 5⅞ inches. S. A. E. rating, 22.5 horsepower. Brake horsepower, 35 horsepower. Cylinder cast, block. Cylinder head, removable. Valves placed, right. Carburetor, Zenith, one inch. Ignition, Atwater Kent. Lubrication, forced feed. Starter, Bijur. Generator, Bijur. Battery, Prestolite, 120 ampere. Clutch, B. & B. dry plate. Motor suspension, three-point. Motor weight, 650 pounds. Valve size, 1½

inches diameter. Crankshaft size, 2¾ inches.

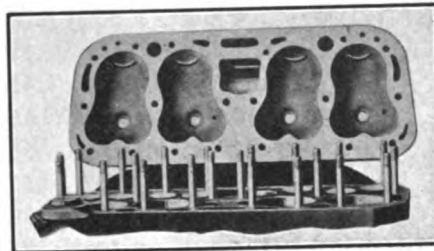
Crankshaft Bearings—Front, 1¾ by 2¾ inches. Center, two inches by 2¾ inches. Rear, 2¾ by three inches. Connecting rod bearings, 1¾ by two inches. Wrist pin bearings, 1 1/16 by 1¾ inches.

Transmission—Type, Atlas. Location, unit motor. Speeds forward, three. Gears, 3½ per cent. nickel. Bearings, main, double row ball. Gear face, 13/16 inches. Universal joints, two steel. Final drive, Atlas work. Rear axle ratio, 5 1/6 or six to one. Torque taken by springs. Propulsion taken by springs.

Frame—Front springs, one-half elliptic, 36 by two inches. Rear springs, one-half elliptic, 46 by two inches. Steering gear, worm and gear. Location, left side. Throttle control, hand and foot, service brake, rear hubs. Emergency brake, transmission. Chassis weight, 2850 pounds. Fuel tank capacity, 10 gallons. Normal motor speed, 1500 revolutions per minute. Turning radius, 18 feet. Body weight allowance, 750 pounds.

Equipment—Two head lights, one tail lamp, one set tools.

Accommodate body of (back of driver's seat), eight feet. Height of body base above ground when not loaded, 31 inches.



Showing Cylinder Block with Head Removed.

Height of body base above ground loaded, 28 inches.

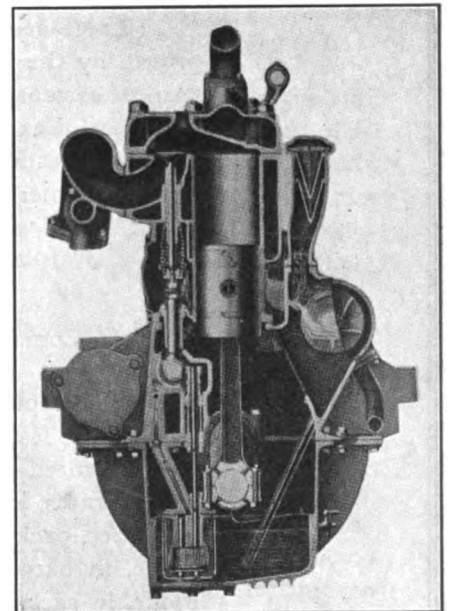
MODEL 44.

Carrying Capacity—1½-2 tons.
Wheelbase—146 inches.

Wheels—Wood.

Tires—Pneumatic cord tires, standard, 36 by six inches front, 36 by six inches rear. Under no circumstances will solid tires be furnished.

Motor and Motor Trim—Location, under hood. No. cylinders, four. Bore and stroke, 3¾ by 5⅞ inches. S. A. E. rating,



Sectional View of Engine.

22.5 horsepower. Brake horsepower, 35. Cylinder cast, block. Cylinder head, removable. Valves placed, right. Carburetor, Zenith one inch. Ignition, Splitdorf magneto. Lubrication, forced feed Starter, Atwater Kent. Generator, Atwater Kent. Battery, Prestolite 120 ampere. Clutch, M. & E. dry plate. Motor suspension, 3 point. Motor weight, 650 pounds. Valve size, 1½ inches diameter. Crankshaft size, 2¾ inches.

Crankshaft Bearings—Front, 1¾ by 2¾ inches. Center, 2 by 2¾ inches. Rear, 2¾ by three inches. Connecting rod bearings, 1¾ by two inches. Wrist pin bearings, 1 1/16 by 1¾ inches.

Transmission—Atlas. Type, selective. Location, unit motor. Speeds forward, three. Gears, 3½ per cent. nickel. Bearings, main, double row ball. Gear face, 13/16 inches. Universal joints, four steel. Final drive, Atlas worm. Rear axle ratio, six or seven to one. Torque taken by springs. Propulsion taken by springs.

Frame—Front springs, one-half elliptic, 36 by 2¾ inches. Rear springs, one-half elliptic, 52 by 2¾ inches. Steering gear, worm gear. Location, left side. Throttle control, hand and foot. Service brake, propulsion shaft. Emergency brake, rear wheels. Chassis weight, 3600 pounds. Fuel tank capacity, 10 gallons. Normal motor speed, 1500 revolutions per minute. Turning radius, 24 feet. Body weight allowance, 900 pounds.

Equipment—One jack, one electric horn, one tire carrier, one Alemite gun.

Accommodates body of (back of driver's seat), 11 feet. Height of body base above ground when not loaded, 33 inches.



The Atlas "Merchant Despatch" May Be Used in All Classes of Retail Delivery.

Typical Motor Truck Express Rates

(These are the rates of the Tidewater Lines, Inc., Maryland, as approved by the Public Service Commission of that state. Though higher than rates charged by some haulage lines, they are typical of the charges of a successful experienced company.) This information is furnished to Motor Truck readers through the courtesy of the National Automobile Chamber of Commerce.

Commodities	Unit Basis.	1 Mile to 15 Miles	16 Miles to 35 Miles	36 Miles to 60 Miles	61 Miles to 80 Miles	81 Miles and Over
Agricult'l Impts. hand. (crated) 100 lbs.		\$0.50	\$0.75	\$0.75	\$0.85	\$0.90
Cider .....100 lbs.		.40	.45	.50	.60	.65
Eggs, secured packed in crates.100 lbs.		.50	.70	.75	.80	.85
Eggs, crates, returned empty....Each		.15	.15	.15	.15	.15
Fertilizer, packed .....100 lbs.		.40	.45	.50	.60	.65
Flour, in barrels .....100 lbs.		.40	.45	.50	.60	.65
Flour, in sacks .....100 lbs.		.50	.55	.60	.70	.75
Apples and pears in barrels....100 lbs.		.50	.55	.60	.70	.75
Oranges in boxes .....100 lbs.		.50	.70	.75	.85	.90
Other kind of fruit (packed)...100 lbs.		.50	.75	.80	.90	.95
Grain .....100 lbs.		.40	.45	.50	.60	.65
Hay .....100 lbs.		.50	.55	.60	.70	.75
Livestock (on hoof) .....100 lbs.		.50	.70	.75	.85	.90
Meat .....100 lbs.		.50	.70	.75	.85	.90
Poultry, live .....100 lbs.		.50	.75	1.00	1.25	1.50
Poultry, dressed .....100 lbs.		.50	.75	1.00	1.25	1.50
Straw .....100 lbs.		.50	.55	.60	.70	.75
Sugar, in barrels .....100 lbs.		.40	.45	.50	.60	.65
Sugar, in sacks .....100 lbs.		.50	.55	.60	.70	.75
Vinegar .....100 lbs.		.40	.45	.50	.60	.65
Barrels (oyster empties returned including cans) .....Each		.25	.25	.25	.25	..

(Continued on Page 492.)

After Its
Record Non Motor
Stop Run of
Nearly 2000 Miles
This Kalamazoo
Truck
Was in Such
Good



Condition
That It
Could Have Start-
ed Away
Immediately on
Another
Trip of the Same
Duration.

Kalamazoo Makes Record

ON THE heels of establishing a record of 82½ seconds for a one-mile dirt track, the new Kalamazoo Speed Truck finished its 100-hour grind Saturday, August the 19th, at 5 p. m., in front of the Kalamazoo County Courthouse. The truck was met by a large crowd of enthusiastic spectators who

cheered heartily when they heard the record of the run.

The truck with an over-capacity load, totaling 2250 pounds of sand, started at 1 o'clock August the 15th, to make a run of 100 hours without stopping the motor. It covered a distance of 1972 miles, or an average of 19.7 miles per hour during this time.

THIS included time for all stops for gasoline and oil, change of drivers, traffic tie-ups and delays, and railroad crossings. One stop was made to replace two valve springs in the motor and four tire changes were necessary on account of punctures. All of the improved freight highways in and out of Kalamazoo for a radius of 30 miles were covered. A good general idea of the "roadability" and efficiency of the truck was thus obtained.

The truck used 138 gallons of gasoline to cover this distance and 14 quarts of motor oil. The fuel average for the entire run was 14.3 miles per gallon of gasoline and 141 miles per quart of oil. This average was truly remarkable considering the fact that the motor was kept running at all times and that there were four different drivers used in relays in handling the truck, and it establishes a sure and fair average for the one-ton truck owner to try and maintain.

Very careful observations of the operations and performance of the truck were made by the engineering department of the Kalamazoo Motors Corporation, and they report that the truck is in first class condition and could continue for another 100 hours. Special atten-

tion is called to the fact that at all times during the run the motor was very cool. There was no time that

HERE'S THE REASON THEY CALL THE KALAMAZOO MODEL T ONE-TON SPEED TRUCK "THE TRUCK WITH RECORDS."

Aug. 6, 1922, at Recreation Park, Kalamazoo, one mile in 82½ seconds on mile dirt track, with body, cab and windshield; official timing.

Aug. 15th to Aug. 19th, 1922, Kalamazoo, 100-hour non motor stop run; distance covered, 1972 miles. Gasoline used, 138 gallons; average miles per gallon, 14.3 miles; oil used, 14 quarts; average miles per quart, 141 miles; average miles per hour, 19.7 miles; truck loaded over capacity. Net weight of truck, 4440. Net weight load, 2250. Gross weight truck and load, 6690. All roads out of Kalamazoo covered.

it was not possible to hold one's hand on the radiator with comfort, and the oil and gasoline mileage shows great motor efficiency. The

run was made during the hottest weather of the summer and in a great many instances the truck was pulled through sand and loose gravel roads.

The truck was standard in every particular and is a duplication of the speed truck which the Kalamazoo Motors Corporation is starting to produce. No special units were used in the truck for the run, nor was the truck specially groomed for the occasion. The run was made as part of the programme of the tests which have been laid out to give this model a thorough trial before placing it in the hands of the public. The results of this run have proved conclusively the remarkable stamina and efficiency which is embodied in this truck. The Kalamazoo Motors Corporation is receiving congratulations on every side for the remarkable showing that the truck made.

FORD BUYS TOLEDO RAILROAD SYSTEM.

DETROIT, MICH., Sept. 10.—The Toledo and Detroit Railway has been added to Henry Ford's Detroit, Toledo and Iron-ton railroad. This line, running between Toledo and Detroit, taps a rich section of the country and it is expected that it will develop greatly under the Ford management. So far as can be learned it will run in conjunction with the D. T. & I.

NATIONAL SAFETY COUNCIL MEETS. (Continued from Page 469.)

5. The adoption and strict enforcement of uniform, practicable laws and ordinances for the safeguarding of vehicular traffic and the protection of the multitude of law abiding drivers and pedestrians against the thoughtlessness and recklessness of the few, and

6. The mobilization of all community forces through state and city safety councils for securing those ends through the overwhelming force of enlightened public opinion.

An address of welcome by Samuel C. Mumford of the Detroit Edison Company and president of the Detroit Safety Council, preceding President Young's address, and talks by Edgar A. Guest, well known writer, and Judge C. L. Bartlett, who has achieved a national reputation for curbing speeders by sending them to the workhouse.

The educational, industrial, community and state phases of national safety work were discussed in the afternoon by Dr. John Wesley Hill, chancellor of Lincoln Memorial University; Dr. John J. Tigert, U. S. commissioner of education; A. H. Lichty, vice president of the Colorado Fuel and Iron Company, and R. M. Little, director of rehabilitation, New York State Department of Education.

One-sixth of all deaths from accidental causes in the United States during 1921 are checked against the automobile; 35 persons were sacrificed each day to the gods of speed and chance taking, the total number of victims reaching the appalling figure of approximately 13,000, an increase of about three and one-half per cent. over the deaths in 1920.

These figures, arrived at by Ambrose Ryer and H. P. Stellwagon of the National Bureau of Casualty and Surety Underwriters in a tabulation of traffic fatalities in 50 representative American cities, presented Wednesday, Aug. 30, before the Annual Safety Congress of the National Safety Council at Detroit, serve to emphasize the increasing menace of the automobile — a juggernaut

which is needlessly stamping out the lives of thousands of human beings annually.

While the automobile was grimly reaping the greatest harvest of lives in its history, all other hazards peculiar to traffic conditions were experiencing a decided reduction in fatalities. Figures for both steam and electric systems show that each passed through 1921 with about 23.5 per cent. fewer fatalities than dur-

ing the previous year. There was an increase of about 7.4 per cent. in the number of persons killed by vehicles other than those mentioned, but despite this fact the total number killed from all traffic causes in the 50 cities tabulated was 4.8 per cent. less than in 1921.

While Los Angeles lead all other cities of the country in the percentage of population killed by automobiles, with a percentage of 291.0 per million population, Chicago, with but 60 cars to every thousand citizens, leads the list with a death rate of 321.5 per 100,000 autos. Los Angeles, with 327 cars to every thousand and population, had a rate of 89 deaths per 100,000 automobiles.

According to statistics compiled by the Interstate Commerce Commission there were 1702 persons killed at railroad crossings in 1921. About 75 per cent. of these, or 1276, were occupants of automobiles. While most classifications of accidents, including that of the United States Bureau of the Census and by the health departments of the 50 cities included in the above report, charge these deaths to the railroads, in this article they are listed in the automobile casualties; this is done because observation shows that few motorists are cautious.

"The number of people injured in automobile accidents cannot be estimated very closely because of the scarcity of data on the subject," reads a report of the National Bureau of Casualty & Surety Underwriters. However, an approximation of such injuries may be made from the following: In the State of Massachusetts for the six-year period, 1915 to 1920, inclusive, 2608 persons were killed in automobile accidents, and 66,671 injured, or 26.4 injuries for every fatality. In the State of Iowa, from 1916 to 1919, there were 14,200 persons injured and 920 killed; a ratio of 15.4 to one. Naturally the ratio of injuries to deaths would be lower in a state like Iowa, where accidents are proportionately more severe, than in Massachusetts, where the congestion of population in the cities accounts for the minor accidents.

Automobile fatalities in 50 American cities, 1921 and 1920—Population 1921, 24,735,383.

	No. of Deaths		Death Rate Per Million Population	
	1921	1920	1921	1920
Akron, Ohio....	35	41	152.8	190.2
Baltimore, Md..	106	97	141.0	130.6
Birmingham, Ala.	40	25	214.9	138.5
Boston, Mass..	104	90	137.3	119.7
Bridgeport, Conn.	25	30	166.7	206.0
Brockton, Mass.	13	15	192.1	224.7
Buffalo, N. Y....	79	103	152.0	201.5
Chicago, Ill....	541	450	194.6	164.9
Cincinnati, O....	80	56	198.3	138.9
Cleveland, O....	154	153	185.3	189.1
Dallas, Tex.....	25	25	151.3	153.9
Dayton, O.....	16	24	101.2	155.4
Denver, Col.....	40	38	152.0	147.0
Detroit, Mich....	134	173	125.2	169.5
Elizabeth, N. J.	9	6	90.8	62.0
Erie, Pa.....	21	17	215.5	179.4
Fall River, Mass.	10	12	82.9	99.5
G. Rapids, Mich.	14	14	99.2	100.7
Hartford, Conn.	21	41	145.7	292.7
Hoboken, N. J..	6	9	88.1	132.2
Indianapolis, Ind.	46	40	141.4	125.7
Jersey City, N. J.	37	41	122.2	126.0
Kansas City, Mo.	65	51	193.4	155.3
Lawrence, Mass.	14	14	146.4	147.8
Los Angeles, Cal.	178	158	291.0	267.8
Louisville, Ky..	21	16	89.0	68.0
Lowell, Mass....	19	8	167.0	470.7
Milwaukee, Wis.	49	66	104.6	143.0
Minneapolis, Minn.	48	42	122.2	109.2
Newark, N. J....	64	74	150.6	177.2
N. Bedford, Mass.	8	8	64.0	65.3
N. Haven, Conn.	19	33	113.8	201.3
New York, N. Y.	849	763	147.6	134.6
Omaha, Neb....	28	38	142.0	194.9
Passaic, N. J....	14	11	214.4	171.1
Philadelphia, Pa.	254	246	136.2	134.0
Pittsburgh, Pa..	111	96	186.1	162.5
Portland, Ore....	27	31	101.9	118.9
Providence, R. I.	39	35	162.7	146.8
Reading, Pa....	15	25	137.5	230.3
Rochester, N. Y.	41	34	134.4	113.7
*St. Louis, Mo..	112	102	142.5	131.3
St. Paul, Minn..	35	33	147.4	140.1
S. Lake Co., Utah	20	27	164.6	226.1
S. Francisco, Cal.	92	92	176.9	179.3
Springfield, Mass.	23	19	160.5	144.3
Toledo, O.....	36	47	142.2	190.3
Trenton, N. J....	29	14	236.2	116.2
Wash'ton D. C.	55	43	121.1	97.1
Yonkers, N. Y..	16	11	154.8	108.6
Total.....	3,837	3,637	155.1	149.7

*There were only 97 deaths in St. Louis in 1921, according to statistics compiled by the St. Louis Safety Council.

Country Entering Period of Prosperity

WITH the coal strike virtually settled, the only obstacle that stands in the way of better times is the railroad shopmen's strike, according to a report on general conditions issued recently by the committee on statistics and standards of the Chamber of Commerce of the United States. When the strikes are out of the way, a better volume of busi-

ness is expected to follow, the report says:

"The railroad shopmen's strike put a heavy burden on all business," according to the report, "causing most serious damage in those fruit and garden truck districts where the products could not be shipped for lack of cars, and were a total and irreparable loss to the grower.

"THE various strikes have aroused profound concern in the country districts, because of some of the sinister and forbidding accompaniments and events of the consequent industrial warfare. The general expectation looks forward to a larger volume of business when the strikes are out of the way."

The report further points out that "it is a year of plenty in every phase of agricultural production—staple and secondary crops, fruits and vegetables alike. There are few record breakers, but plenty and more of everything with such surplus as may be needed for export.

"One most important factor is the great sufficiency of forage and food

for live stock, since it lies at the foundation of cattle raising and of the dairy industry. Live stock of all kinds is generally in good shape, save in the southwest where the great grazing ranges are drying up and the stock water failing. Live stock prices have fallen so that complaint comes from some far-away sections that the demand for cattle is light and prices are unremunerative. But this is not the general story, and the outlook is for an increase in the number of live stock this fall, especially in hogs, which, even at the reduced prices, are the best form in which to market corn.

"The dairy industry is steadily increasing, as a farming accompani-

ment in every state, even in the 30 deserts of New Mexico and Arizona. Along with the raising of poultry it has become an ever present help in time of trouble in every commonwealth, because of the steady income it brings the farming population.

"High freight rates on his products, especially commodities, is one of the things that is most troubling the farmer, and, as he sees it, preventing him from making a satisfactory profit on the fruits of his toil.

"There will be much building this fall, especially in the cities and large towns and in such country districts as have spare money from their crops.

DITCH DIGGER DOES EXCELLENT WORK

A CALIFORNIA man has found a brand new job for a White truck and those who have watched the motor truck field broaden and

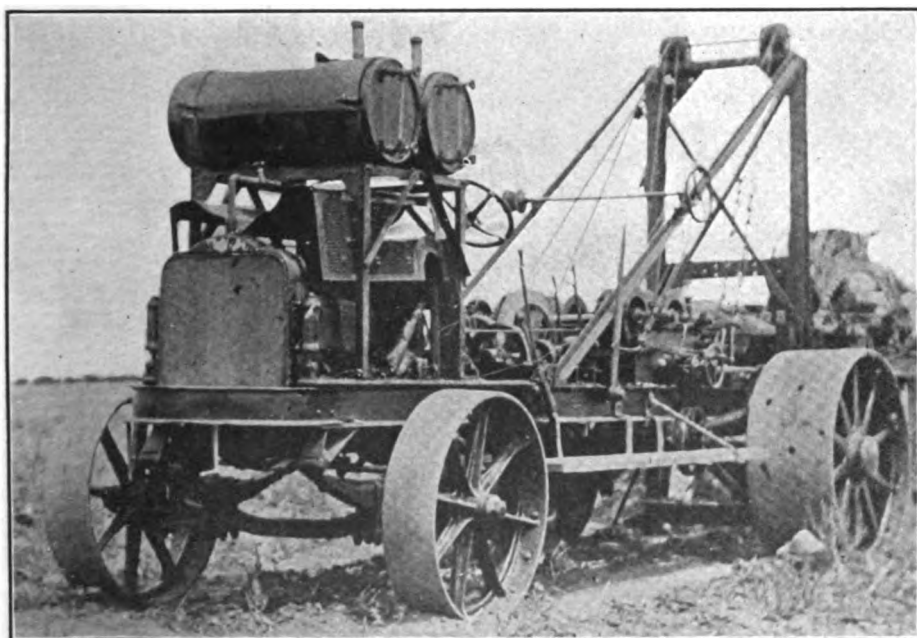
expand year after year would even be surprised if they saw A. H. Borwick's new style ditch digger that is digging 3000 feet of ditch a day for

the Miller & Lux interests at Mendota, Cal.

Borwick's idea came when he was working on a contract for digging irrigation ditches in the Santa Clara valley—and with an old White good roads truck that was past due in the happy hunting grounds he started. The result was a ditch digger that is propelled by the original White truck motor and capable of digging a ditch three feet wide and four and a half feet deep, having vertical sides that meet the flat bottom at right angles.

Borwick states that his machine will do better work than a skilled workman and will average 3000 feet a day even when considerable hardpan is encountered.

R. E. Fielder has been appointed chief engineer of the Fifth Avenue Coach Company, New York City. Mr. Fielder is considered to be unusually well qualified for his new duties.



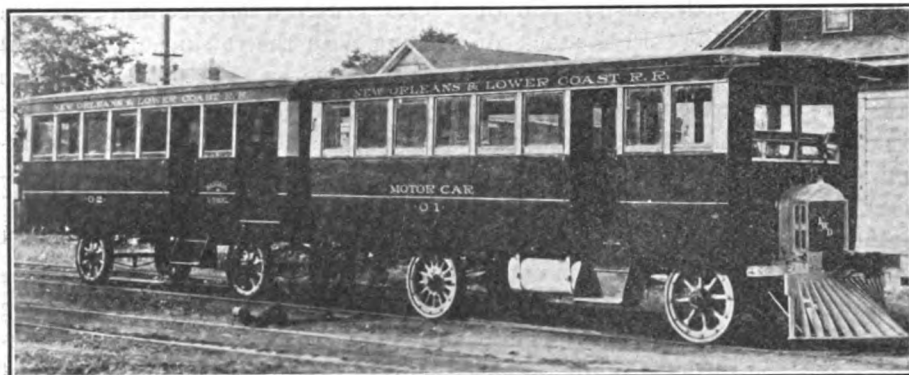
This Outfit Easily Digs 3000 Feet of Trench a Day.

FWD Makes Good in Varied Service

THE operation of an FWD rail car since Nov. 3, 1920, by the New Orleans & Lower Coast Railroad on a run between Algiers and Buras, La., at a steady and substantial profit has proven to the officials of that road the practicability and the efficiency of gasoline railway equipment.

A steam train was formerly operated on this 60-mile run at a steady loss. During the war the contin-

uance of steady losses appeared to be inevitable, so the morning train on this particular run was discontinued entirely. After the war the officials of this line decided to re-establish the service, using gasoline equipment. They purchased a chassis from the Four Wheel Drive Auto Company, Clintonville, Wis., and built a body for it with a seating capacity of 30 passengers, in their own shops.



This FWD Train Has Changed the Figures of a Short Run on the New Orleans and Lower Coast Railroad from the Red to the Black Side of the Ledger.

IT WAS completed and installed so that the car was placed in service on Nov. 3, 1920.

Since that time the car has made one round trip daily, except Sundays, between Algiers and Buras. In making this run the speed of the car ranges up to a maximum of 35 miles per hour and the entire run of 60 miles, including time for stopping, is made in about four hours.

An average cost of about 15 cents per mile is necessary to operate the gasoline car. This includes fuel, oil, repairs, replacement parts, salaries of motorman and conductor, insurance. The cost of operating the train, consisting of a steam locomotive and two coaches, over the same run is 41.8 cents per mile.

This cost is computed on the same basis as the cost of operating the motor car.

Neither one of these figures includes the right-of-way maintenance cost, but it stands to reason that the heavy locomotive with two heavy coaches would do more damage to the right-of-way than the motor car which weighs only about $6\frac{1}{4}$ tons. In other words, the motor car saves 26.8 cents per mile and if the right-of-way maintenance costs were in-

cluded in each of these figures the saving would probably be considerably more. Figuring on a 302-day year with 120 miles of travel to the credit of the motor car each day, one can readily see that the saving through the use of motor equipment mounts up into thousands of dollars per year.

Since the inauguration of motor

car service on this run the patronage of the line has increased to such an extent that an addition to the equipment has become necessary. However, instead of going back to the use of a steam train, the officials of the road purchased a trailer chassis from the Four Wheel Drive Auto Company and have built a body for it. By changing their seating arrangements in the motor car the two-car train now seats 52 passengers, it also has a baggage and mail compartment and a toilet. With this addition to the equipment a more complete service is given and the comfort of passengers is increased.

It is believed that the additional car will not make it necessary to increase the running time between Algiers and Buras, nor will the expense of operation increase the cost per mile very noticeably.



Stanley Carman, Prominent Mason Contractor of Long Island Had Difficulty in Transporting His Concrete Mixer from One Job to Another. He Solved the Problem Effectively by Means of His FWD Truck.



An Owner Once Said of His FWD Truck: "It'll Carry Off Anything You Can Load on to It." This Picture Seemingly Bears Out His Statement.

In operating their motor equipment the New Orleans & Lower Coast Railroad has adopted the policy of having a man spend a short time each night going over the equipment after it has been placed in the shed and seeing that everything is in ship shape. This plan not only insures safety to passengers and eliminates delays through breakages during the run, but it adds to the life of the equipment.

Although operating conditions vary on different railroad lines, such facts and figures above are fast convincing railroad operators that railway motor equipment has an important place in the success and profitable operation of the country's railroads.

FWD Moves Threshing Engine.

Proving that FWD equipment ably fills any and all needs that may arise for a dependable, efficient and wholly trustworthy power hauler, an incident in connection with the sale of a piece of farm machinery and the way in which it was delivered is cited. It seems that August Kuester, dealer in farm machinery at Clintonville, Wis., recently made a sale of a threshing engine to a customer at Breed, Wis. To drive it overland would have required too much time and with the railroad strike holding up freight shipments that method had also to be discarded. The dealer wished to make delivery and the customer wanted his machine, but there seemed to be no way of transferring it from the dealer's implement warehouse to the farmer. As a last resort the D. J.

Rohrer Lumber Company of Clintonville was called upon to put their

DONT'S FOR THE MOTOR TRUCK DRIVER.

TO INSURE better care of its motor trucks by their drivers, one company operating a fleet of Republic trucks keeps the following list of DONT'S posted in a conspicuous place on their loading platform.

1. Don't try racing with a touring car; your truck was built for strength, not for speed.
2. Wash your truck frequently; a dirty car can spoil a lot of our advertising.
3. Street car tracks are nice on springs, but hard on tires—and steel costs less than rubber.
4. Don't neglect a loose part, even though it seems to operate more freely that way.
5. Don't forget to watch the other fellow ahead; a slow stop on your part nearly always costs you a punctured radiator.
6. Use your brakes when getting "spotted;" platforms were built to load from not for bumping posts.
7. Don't drive too close to the curb; edge-trimming is a fine institution for pie crusts, but too expensive for truck tires.
8. The steering wheel is vastly important, but it is well also to give the grease cups an occasional turn.

FWD truck and trailer on the job. The front wheels were removed from the steam engine and loaded on the truck, together with some other odds and ends of equipment. The engine was loaded on the trailer and properly braced and secured. Delivery was made at Breed, a distance of 40 or 50 miles, in a few hours, although the load was a little top-heavy and the run was made slowly so as to avoid accidents. Any other available means of delivery would have required days.

This is an extraordinary use for motor equipment, yet it goes to show that every day the motor truck is filling a new need and more especially so since the railroad strike has had its effect on general transportation.

Transports Concrete Mixer.

When Mr. Stanley Carman, masonry contractor of Woodmere, Long Island, had a little difficulty in the transportation of his concrete mixer, he hit upon the idea of mounting it on his FWD truck. He also mounted 10-inch steel flanges on the front wheels of his truck and 12-inch flanges on the rear wheels. These he claims enable his truck to go over soft ground, which is frequently encountered in going onto many jobs.

When Mr. Carman is ready to move his mixer from one masonry job to the next he merely cranks the truck and away he goes. The motor truck cuts down the moving time between jobs considerably and facilitates the placing of equipment in just the location where it can be used to the best advantage on the job.

AMERICAN STEAM TRUCK PURCHASES PLANT.

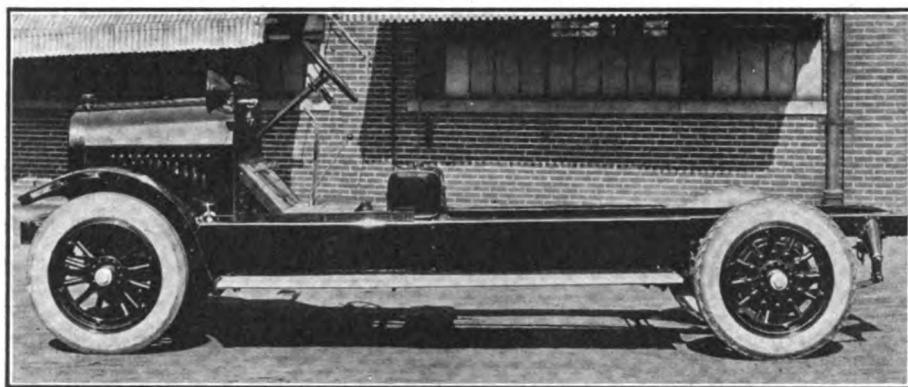
CHICAGO, ILL., Sept. 8.—According to what is believed to be authentic information the American Steam Truck Company has purchased the holdings of the Duty Motor Corporation of Elgin, Ill., and will start manufacture of the various models in the near future.

President Howard of the Chicago company, while admitting that the contract had been signed, stated that nothing further would be done in the matter until it had been ratified by stockholders of the motor truck company and the Chamber of Commerce of Elgin.

Dorris Truck Designed for Hard Service

PERFECTION of any individual unit has not been sought in perfecting the Dorris K-2 truck, instead it has been constructed of time proven engineering successes. The original mechanical features of the first Dorris trucks are embodied in the present product of this company, such as the long stroke engine of the valve-in-head type, multiple disc dry plate clutch, and the pressed steel frame.

From time to time improvements have been added, which have increased the sturdiness, dependability and economy of operation, such as the five-bearing crankshaft which makes for longer life of the engine, and the Dorris distillator. This device completely vaporizes the low grade gasoline of the present day, it is stated, and makes the truck both sufficient and economical.



The Original Mechanical Features of the First Dorris Trucks Are Embodied in the Present Product of This Company.

THE Dorris Motor Car Company of St. Louis has been engaged in the manufacture of motor vehicles for the past 17 years and the present product is the result of the large amount of engineering experience accumulated by the company in this time. One idea has been constantly kept in mind, that of perfecting a machine which would give the greatest performance, longest life and the greatest satisfaction to the public.

The specifications for the K-2 one-ton truck are as follows:

Axles—Front, Timken "I" beam section. Rear, Timken bevel gear, 4 3/13 to one ratio.

Brakes—Duplex, 15 inches diameter by three inches face. Raybestos lined.

Carburetor—Improved M-2 Stromberg, aided by Dorris distillator.

Chassis Weight—Fully equipped, 3270 pounds.

Clutch—Multiple, dry disc built unit with motor.

Control—Left drive, center control, spark and throttle under steering wheel, foot accelerator.

Crank Case—Lynite aluminum. Heavily ribbed.

Crank Shaft—Five extra large main bearings, all 2 1/4 inches in diameter.

Connecting Rod Bearings—2 1/4 inches in diameter.

Distillator—An exclusive Dorris feature which successfully vaporizes modern low grade gasoline.

Distribution of Load—Ten per cent. on front wheels, 90 per cent. on rear wheels.

Electrical Equipment—Six volt 139 ampere-hour storage battery, Westinghouse starting motor, Westinghouse self-contained generator, Klaxon horn, electric side and tail lights, switches, etc.

Equipment—Complete set of tools, extra rim.

Fenders—Pressed steel enameled. Running board, ash board covered with linoleum, bound with aluminum moulding.

Finish—Chassis are tested ready for use; finished in one coat of red lead and one coat of color varnish.

Frame—Cold pressed from hot rolled carbon stock five inches deep, two inches flange, 3/16 inches thick.

Gasoline Tank—18 gallons capacity. Tank mounted in driver's seat.

Ignition—Bosch "DU-4" straight high-tension magneto, flexible coupling.

Lubrication—Full pressure.

Motor—Dorris perfected valve-in-head, four cylinders cast en bloc, detachable head, four-inch bore, 5 1/4-inch stroke. Horsepower, N. A. C. C. rating, 25.6. Motor mounted on three-point suspension.

Propeller Shafts—Two thermoid Hardy universal joints.

Radiator—Copper tubular, with special core and shell, permitting easy demounting of core by removing four bolts. Cast aluminum shell.

Seat Base and Seat Extra—Extra cost added to price of chassis.

Speedometer—Mounted on dash, driven by transmission.

Springs—Both front and rear chrome vanadium steel, heat treated. Front, eight leaves, 38 inches long, 2 1/4 inches wide. Rear, nine leaves, 50 inches long, 2 1/4 inches wide.

Steering Gear—Ross extra heavy worm and solid nut type. Wheel, 15 inches in diameter.

Tires—All wheels 33x5 cord truck type.

Transmission—Unit with motor. Three speeds forward, one reverse. Gears nickel steel, heat treated.

Tread—56-inch front and rear.

Valves—Intake, rich tungsten steel. Exhaust, Cobalt chrome.

Wheels—Wood, artillery type.

Wheelbase and Frame Length—120 inches to accommodate seven to eight-foot body; 132 inches to accommodate nine to 10-foot body; 144 inches to accommodate 11 to 12-foot body.

Gas tank to end of frame
120 inches 79 1/2 inches
132 inches 91 1/2 inches

144 Inches 103 1/2 inches
Dash to end of frame
Wheelbase 124 inches
120 Inches 136 inches
132 Inches 148 inches
144 Inches 148 inches
Dash to center of rear axle
Wheelbase 92 inches
120 inches 104 inches
132 inches 116 inches
144 inches 116 inches
Width of Frame—32 inches.

Chatooga Bridge Rebuilt by Forest Service

EXPENDITURES of \$10,818 of National Forest Highway funds for the maintenance of eight miles of the three states road in Georgia and for the rebuilding of the Chatooga river bridge on this road, near Walhalla, S. C., have just been approved by Secretary of Agriculture Wallace. This money was made available for roads of primary importance to the state, counties or communities within, adjoining or adjacent to the national forests.

Two projects have been approved, both within the boundaries of the Nantahala National Forest. The present Chatooga river bridge will be entirely reconstructed in accordance with standard specifications at a cost to the Federal government of \$8000. In addition 8 1/2 miles of the Three States road, from the North Carolina line to the Chatooga river will be maintained and additional drainage installed at a cost of \$2818.

This programme for improvement was recommended to the Secretary of Agriculture by the Forest Service and the Bureau of Public Roads jointly, after conference with state officials. The construction of the bridge will be handled by the Bureau of Public Roads.

M. H. Wells has accepted a position as chief engineer of Detroit Motors, Inc., Detroit, and is located at Trenton, N. J.

Gasoline Trade of the Far East

(By HOMER S. FOX, Petroleum Division, Department of Commerce.)

THE growth of the gasoline trade in the Far East reflects the steadily increasing demand for this product in the Orient as in other sections of the world. In most far eastern countries the demand for gasoline, benzine, petrol, or motor spirit, as it is variously called, has not only rapidly increased, but has often exceeded the available supply to such an extent that acute shortages have been felt. Various attempts to relieve the situation have been made at different times, including government supervision of prices and distribution, as well as efforts to find a satisfactory substitute, particularly in those countries having no commercial production.

THE gasoline producing countries of the Far East are the Netherlands East Indies, British India and Japan. In the first two the production practically takes care of the domestic demand, while in Japan the importation of appreciable quantities is necessary to supplement local production. The growing demand for gasoline in Japan has been accompanied by a decline in crude oil production, and although the gasoline output has increased until recently, increased imports have also been required. Gasoline is used for automobiles, of which there are some 13,000 in the islands as compared with only about 500 prior to the war, in marine motors, and for industrial uses, particularly in the rubber industry and in the manufacture of bean cakes and vegetable oils.

The prices of gasoline in Japan have reflected the increased demand, the 1914 price of 45 to 50 cents a gallon having risen to \$1 a gallon in some cities in 1919. During 1920 and 1921, however, prices fell somewhat, and during the first part of 1922 a price-cutting campaign and increased stocks brought it still lower.

Exports of gasoline from Japan are comparatively small, and consumption is therefore indicated by the output plus imports. The production increased from 890 gallons in 1913 to 6,630,000 gallons in 1919, and 7,110,000 gallons in 1920. The imports show a similar rise, increasing from 296,000 gallons in 1913 to 2,663,000 gallons in 1919 and 6,106,000 gallons in 1920. During 1921, however, the imports declined slightly from the 1920 figures, amounting to only 5,814,000 gallons.

Chinese Imports Increase.

There has been a steady growth in the Chinese imports of gasoline, although this product in China is still of much less importance than kerosene. Gasoline is imported and distributed chiefly in cases containing two five-gallon tins each, as the sale of a particular brand often depends upon the value of the empty container.

As there is no production of gasoline in commercial quantities in China the consumption may be considered as equivalent to the net imports, which amounted to 465,577 gallons in 1913, 819,556 gallons in 1914, 693,129 gallons in 1915, 685,906 gallons in 1916, 1,183,895 gallons in 1917, 1,194,290 gallons in 1918, 2,174,748 gallons in 1919, 2,604,634 gallons in 1920, and 4,664,455 gallons in 1921. During the pre-war period a large portion of the gasoline used in China came from Russia, while at present the United States is the

chief source of supply, the quality being in general the same as that used in America.

Australia Dependent on Imports for Gasoline Supply.

Gasoline is shipped to Australia in cases containing two cans of four imperial gallons (4.8 United States gallons) each and in galvanized drums containing 52 to 53 United States gallons. Gasoline and similar products are not produced commercially, although motor spirit of good quality is said to have been obtained from shale oil. During 1920-21

some 2,600,000 gallons of shale oil were produced. This oil is said to yield about 16 per cent. of high grade petrol. The Anglo-Persian Oil Company, in cooperation with the Australian government, is preparing to erect a refinery at Melbourne, but this will not be in operation for some time.

In June, 1918, the government fixed the price of gasoline at 78 cents per gallon; in 1919 it was bringing 82 cents per gallon, while in May, 1922, the price ranged around 60 cents.

Australian imports of gasoline come chiefly from the United States and the Dutch East Indies, and small quantities are reexported to the neighboring Pacific islands.

New Zealand Imports Show Steady Growth.

Gasoline in New Zealand is used for motor cars, which have increased from about 10,500 in 1914 to some 38,000 at the present time, and also for dairy and farm machinery. There is practically no production, although experiments of various kinds have been made.

The United States and the Netherlands East Indies (Sumatra) supply the principal part of the products used. Small quantities of benzine and gasoline are reexported from New Zealand to Samoa, Tonga, Fiji and a number of groups of Pacific islands.

British Indian Imports Small.

The imports of foreign motor spirit into India are comparatively small, as the principal part of the local demand is supplied by the gasoline produced in Burma. Imports of gasoline were 37,000 gallons in 1913-14, 52,000 gallons in 1918-19, and only 2000 gallons in 1920-21. During 1919-20 some 10,000,000 imperial gallons were exported from Burma to other parts of India, and in 1920-21 these exports reached 15,000,000 gallons. Exports of gasoline, benzine and other motor spirit to foreign countries in 1919-20 totaled 36,000,000 gallons out of total petroleum exports of some 38,000,000 gallons, nearly 21,000,000 gallons going to the United Kingdom and the remainder chiefly to France and Italy, although small amounts were sent to other countries.

Exports from Dutch East Indies.

The gasoline and benzine production of the Dutch East Indies not only supplies the local demand, but provides a considerable surplus for export, which goes largely to the Netherlands, British South Africa, Australia and New Zealand, Japan and to the Straits Settlements for reexport.

TOTAL OF 1840 YEARS OF SERVICE FOR 334 EMPLOYEES.

WHILE the automobile industry is as yet in its infancy there are 334 persons in the employ of the General Motors Truck Company of Pontiac, Mich., who have a total of 1840 years of service with that organization, according to figures just compiled at the factory.

The figures show that in the accounting department there are six persons who have a total of 32 years of service to their credit; in the engineering department there are eight with a total of 55 years; in the cost division there are four with 11 years; in the advertising department there are three with 24 years service; in the billing department there are two with 17 years; in the production department there are seven with 27 years credit; in the purchasing there are seven with 41 years; there are 15 foremen and superintendents who have been with the company a total of 131 years; in the experimental department there are four with a total of 17 years; in the miscellaneous departments there are three with a total of 20 years, while in the factory there are 275 employees with a total of 1375 years service.

While the records made in the various departments are not anywhere near as high as those made in other lines of long established business houses, the truck factory executives feel that the percentage is extremely high when it is remembered that the industry is less than 20 years old.

LEGAL POINTS

By SAMUEL WANT

THE steady increase in the number of automobiles stolen annually, the staggering amount of the aggregate value of stolen cars and the infrequency of convictions for this offense, combine to make it clear that special legislation is necessary to check this form of crime. The automobile offers such peculiar facilities for theft that no adequate precautions are possible. Cars must as an ordinary incident of use be parked in places readily accessible to the public, and it is but the work of a moment for the thief to start the car and be out of sight. Locking devices apparently are not adequate.

Thus it appeared in a Minnesota case, that the owner of a car left it beside the curb, locked the ignition and chained a wheel. The thief was provided with a key which unlocked the ignition and the chain broke when the car started.

Apparently the best point of attack is to provide a system of identification by which stolen cars can be detected when in the possession of subsequent purchasers. This would not only break up the market for such cars, but would in many instances provide a clue leading to the thief. The ordinary means of identification are, however, futile against an organized gang of automobile thieves.

IN PREVIOUS articles in this series attention has been called to the rule that while ordinarily a person riding in an automobile is not chargeable with the negligence of the driver, so as to bar a suit for damages against another motorist or a street car company for injuries resulting from a collision, such a person may nevertheless be deprived of this right if the facts of the particular case show that he participated in the drivers' negligence, or carelessly failed to give the driver warning of obvious dangers, or otherwise shared the driver's heedlessness in a positive manner. A full discussion of the legal principle involved in such cases is contained in a recent Wisconsin case which involved a suit by a woman for injuries received in a collision when she was riding with her husband. The latter was driving the car and the wife was sitting in the rear seat when a collision occurred. In holding that the husband's negligence was not chargeable to the wife, the court said:

"It is argued that the court erred in refusing to submit to the jury the question of the contributory negligence of the plaintiff herself. Doubtless the plaintiff was bound to use such care as a reasonably prudent person would exercise under similar circumstances.

"It is claimed that the rate of speed was excessive, and that plaintiff should have known it and remonstrated. Even if plaintiff had been intent upon the sub-

ject, it is doubtful whether under the conditions she could have formed any intelligent estimate of the rate of speed. There is no evidence that she had any reason to doubt the care or skill of the driver of the car. It is true that she was not paying attention at the time to the operation of the car. But we do not understand that a wife, sitting in the rear seat when her husband is driving a car over a road apparently in good condition, is bound to pay constant attention to the management of the car, or to keep a constant lookout for imperfections in the road.

"Much advice and many suggestions to the driver by one sitting in the rear seat are not conducive to the best management of the car. If the occupant sees the driver is driving at a dangerous rate of speed, or in violation of the law, reasonable care would require that the passenger protest. This was illustrated in a recent case where the plaintiff, a guest, testified that they were going at least 50 miles per hour in a city; he was sitting on the front seat, keeping no watch, and merely remarked that they were going pretty fast. They ran into a railroad train standing on a crossing and it was held that the plaintiff could not recover damages."

ONE form of profiteering as applied to automobile supplies is dealt a knockout blow by a recent statute of the State of Wisconsin. By this enactment it is made a penal offense for a chauffeur to take, "directly or indirectly, any bonus, discount or other considerations for supplies or parts furnished or purchased for his employer's car, or upon any work or labor done thereon, or on the purchase of any motor vehicle for his employer." The penalties of the act apply also to any dealer who is found guilty of paying or giving any bonus or other consideration prohibited to be given by the terms of the act.

IN A Missouri case it appeared that an automobile was stolen while standing in front of a store. It was at once taken to a garage, the manufacturer's numbers filed out and others substituted, the body taken off and that from another stolen car put on, the car painted and some accessories added. A confession made a conviction possible in that case, but it is obvious that had the car as altered passed into the hands of a purchaser it would have been almost impossible to discover or identify it.

Practically every state requires the annual registration of automobiles for the purpose of issuing license plates. A precise description of the car is required, but no showing of title. Under this system a stolen car on which the manufacturer's

numbers have been changed may be registered in the state where it was stolen without affording any trace of the theft. But if it was required that the application for a license should state where the car was registered for the preceding year and by whom, and this information was investigated in each case, it would be impossible to obtain a license to operate a stolen car. If the identification numbers on the car were not changed a reference to the previous registration would disclose any report which had been made of the loss of the car. If the numbers were changed, no previous registration could be shown, and the fact that the car was illicitly held would be apparent. In case of a new car not previously registered, a statement of the time and place of purchase would be equally effective.

THE indirect and unforeseen damages for which a motorist may become liable in consequence of an accident are pointed out in a recent case in which it appeared that a pedestrian who suffered a comparatively slight accident developed peritonitis, and that phlebitis and pneumonia supervened. Against the urgent objection that these conditions were due to supervening causes with which the accident had no connection, the court held that the motorist was liable.

THE subject of automobile insurance presents so many possibilities of loss for the unwary owner who relies upon his policy for protection against loss that further reference to some of the recent decisions may be desirable.

In one case recently decided it was held that a policy insuring the automobile against loss or damage by theft, robbery or pilferage would not protect the owner against a loss in the form of the diminution in value of the machine by reason of its use by one who wrongfully appropriated it, where the car was afterwards returned. In another case the policy was held to be avoided by the permanent removal of the machine from the garage referred to in the policy to another garage.

But where the policy prohibited the renting of the car for passenger service or other hire, the use of the car for such purposes without the owner's knowledge did not violate the policy so as to prevent a recovery for damage sustained during the unauthorized use. Of course if the owner had accepted the proceeds of the hiring, even though he did not authorize it, this would have prevented him from enforcing his policy. And it was further held that the prohibition against hiring is not violated by a single transaction of that character, the prohibition referring to habitual hiring.

ON THE principle decided in the cases above referred to, it has been decided in Minnesota that the presence of a car in the center of the road after an accident is not to be taken as a violation of law where it is shown that the car was forced into that position by persistent skidding, due to the wetness and curved surface of the road.

An Illinois case holds that where the driver of an automobile applies the brakes suddenly in an emergency to avoid striking a pedestrian, and by reason of the application of the brakes the car skids and strikes another automobile, the driver will not be held to have been guilty of negligence. On the other hand, it was held in another case that if the driver is proceeding at an excessive rate of speed under the circumstances indicated, he may be found guilty of negligence, if the car skids when he tries to avoid children who recklessly get in front of the car.

As pointed out in a collection of the recent cases in the new edition of Huddy on Automobiles, the motorist would clearly be liable if, when driving over a slippery pavement, he endeavors to make a quick turn not called for by any sudden emergency and his car skids into a pedestrian.

IN A recent case decided in a federal court the evidence showed that a wagon which was proceeding on the right side of the road was struck from the rear by an automobile. There was no evidence as to the speed of the car, or as to the precise cause of the accident. The court decided that this state of facts presented an exception to the usual rule, requiring proof of some specific act of negligence on the part of the motorist. The mere happening of such an accident, the court said, indicated negligence, unless it is affirmatively shown that some unusual state of facts exculpated the motorist from the natural inferences deducible from the situation.

IN A recent South Dakota case an automobile truck was loaded with furniture. The load extended considerably beyond the sides of the truck, and the projecting articles were made of very highly polished material. From one of the elements of this state of facts a passing horse became frightened, ran away and caused a considerable amount of damage. The motorist was sued for the resulting loss. The court decided that the motorist was not responsible. In preceding articles attention has been called to statutes passed in several states to deal with the question of projecting loads.

SOME strong points for "safety first" propaganda are to be found in current decisions involving automobile accidents. For example, in a California case the right of an injured pedestrian to recover damages from a negligent motorist turned upon the degree of care which must be exercised by pedestrians who cross busy thoroughfares at points other than the established crossings.

In the case in question the evidence showed that the pedestrian, intending to cross the street in the middle of a block,

looked once in each direction as he stepped from the curb and seeing no vehicles in dangerous proximity proceeded without further precautions. An automobile happened to come along at the time, driven at an unlawful speed. It struck the pedestrian. He claimed that if it had been going at the legal speed he would have passed in front of it in safety, and the point was also made in his behalf that pedestrians should not be required to assume that vehicles may be driven at excessive speeds on a city street or to take special precautions to guard against possible violations of law. Thus the crux of the case was the dual proposition that the accident could not have happened (1) if the automobile had not been driven at an illegal speed or (2) if, notwithstanding this violation of law, the pedestrian had kept a diligent lookout for vehicles after he stepped from the curb.

Following the principle of law that no damages are recoverable for injuries which are due to the joint negligence of the injured person and another, the claim in this case failed.

A RECENT New York case involves the question whether liability for negligent driving rests upon the hospital or the garage under the following state of facts:

By agreement between the two concerns the hospital ambulance was housed and cared for in a commercial garage, the driver being also furnished by the garage whenever the ambulance was in use. On all trips the driver was accompanied by an orderly of the hospital.

On the occasion which gave rise to the suit the ambulance was being driven at about 45 miles per hour and the evidence showed that the driver was urged throughout the trip by the accompanying orderly to drive at top speed.

Upon this state of facts it was held that the hospital could be held liable for an accident which was directly attributable to the reckless driving of the ambulance.

AS HAS been frequently pointed out in this series, a violation of law on the part of the motorist does not of itself render him liable for an accident which occurs while the violation continues, the rule being that there must be some direct connection between such violation and the accident complained of, to create liability. In a recent Minnesota case the principle is applied to a situation in which the motorist who was violating the law was the complaining party. The claimant in this case had parked his machine within 20 feet of a fire hydrant, which was in violation of a local ordinance. While in this position the car was struck by a carelessly driven truck and crushed against the hydrant. In a suit against the owner of the truck the latter contended that the loss was due to the plaintiff's violation of law, and that this should defeat his claim. The court did not, however, sustain this defense. In several other recent cases decided in the same state claims for damages to cars have been sustained although the evidence showed that the machines were not registered. As heretofore pointed

out in this series there is a divergence of view on this question on the part of the courts of the various states.

IN A recent Florida case it appears that a motorist entered upon a railroad crossing when a train was in sight about a quarter of a mile away. Under the circumstances then presented there seemed ample time to make the crossing, and for this reason the engineer did not reduce his speed when he first saw the car on the crossing. As the car reached the middle of the crossing its engine choked down, causing the train to collide with the car and injure the occupants. As the facts showed no act of negligence upon the part of the men in charge of the train, the claims of the injured motorists against the railroad company were held untenable.

There is a "safety first" argument in this case, too. Obviously it is not prudent, to say the least, to attempt to cross tracks in sight of a train within a quarter of a mile away, for whatever the ordinary probabilities of such a situation may be, the case shows the necessity of guarding against unusual contingencies, too.

THE court of appeals of California holds that in assessing damages for a woman who has been injured in an automobile accident, the jury may take into consideration the fact that in consequence of the accident the woman has acquired a nervous horror of the noises of bells, automobiles and ambulances, all of which happened to figure in her accident.

THERE is a strong "safety first" argument, as well as an unforeseen verdict, in a recent New York case dealing with the liability of a motorist who leaves his car in the street without first cutting off his power. In this case an electric truck was left in the street with its switch on. While the brakes were applied they were worn and did not work efficiently. A small boy began playing around the bumper and another boy got in the cab and touched the lever by which the car was started. The first boy was run over and sustained injuries from which he afterwards died. It was held that the owner of the machine was liable to the parents of the child thus killed.

IN PRECEDING articles attention has been called to the liability of a garage owner for the loss of automobiles stored in his garage and stolen therefrom. In a recent decision of the Supreme Court of Minnesota the court extended this rule of liability to a case in which there was a notice conspicuously posted in the garage warning patrons that the owner would not be responsible for cars stolen from the premises. The evidence did not show that the particular claimant in this case had seen the notice, and the court expressly withheld decision on the question whether a contrary ruling would have been made had the facts shown that the claimant was aware of the notice in question.

Courtesy and the Broad Highway

A GREAT deal of emphasis rightfully has been laid upon the subject of road courtesies and drivers continually are being urged by various publications to give heed to this important adjunct to good driving. It is currently stated that the road rules in England are much more carefully heeded than are those of this country, though this is undoubtedly a question on which much may be said on both sides. Motor-izing organizations throughout the country have paid

some little individual attention to this all important phase of car driving, but it seems as though a campaign to be operated by such organizations simultaneously would do a great deal to teach the courtesy which is so noticeable at the present time by its absence. It is a fact that authorities have stated with conviction that nearly half of all the fatal accidents that occur are traceable directly to this lack of courtesy; beside which there is a great amount of annoyance resulting from this cause.

ONE of the most common instances of lack of care for the well being of fellow motorists, and at the same time one of the most annoying, is the practise of leaving broken glass on the surface of the highway. When a driver gets into a collision that breaks the lenses in one or both of his head lamps, he is likely to think of little except his own misfortune. If, however, he would for a moment consider the feelings of the other drivers who may run over this mass of broken glass he would take the time necessary to sweep the glass into the gutter. Glass frequently gets thrown into the gutters in these Volstead days from empty bottles thrown by motorists who have successfully defied the law.

Leaving broken glass in the roadway very likely spells misfortune for several other machines that may pass that way. If the sharp bits do not immediately cause a puncture, they are likely to be worn into the tread of casings and eventually work through until they puncture the tube and cause trouble. It takes only a few minutes for the person who has had his lamps broken, or the man who has a bottle to throw away, to kick the glass into the gutter and if this were the rule many punctures would be prevented.

Another lack of road courtesy that frequently is observable is the practise that some drivers have when they have occasion to change a tire or to halt for some other purpose, of stopping their car well out from the curb. It would seem as if ordinary common sense would dictate that they stop as close to the curb or the side of the road as possible or, if it is convenient, drive into a side street or road. It is not very safe to work about a car when many others are passing close to it and in changing a tire the driver much of the time has his back turned toward the traffic.

If the car is set near the edge of the road, other courteous drivers will give it as wide a berth as they can, but if the stranded vehicle is set well into the road the drivers are forced by the oncoming traffic to run close along side the automobile under repair. It is the wiser and more courteous policy to run the machine with the puncture or blowout into a side street when that can be done or at any rate, close to the side of much traveled road.

The cases of the driver who cuts sharply in ahead and of the other driver who persists in holding the middle of the road

are very common. The driver who cuts in without giving the driver ahead a chance to escape scraping his fenders is guilty of a dangerous, as well as of a discourteous practise. In passing a car the operator ought to get far enough ahead before he cuts in to give the driver behind a chance.

The person who insists on keeping to the middle of the road, despite signals from behind that somebody wants to pass, is common on the road and this is not confined to amateurs or to women drivers as some people think. It is not

STREET RAILWAY BIGGEST AUTOMOBILE USER IN GEORGIA.

ONE hundred and six motor cars and motor trucks are owned by the Georgia Railway and Power Company. This is one of the largest fleets of motor vehicles in the state. Preston S. Arkwright, president of the company, says, "The time will come when we will be using automobiles as public transportation vehicles in territory where the business would not justify the building of rail lines."

infrequent to come upon a huge chauffeur driven limousine, whose owner has instructed the driver not to go over 15 miles an hour, which persists on holding the middle of the road, although another driver moving at legal speed wants to pass. If anyone prefers to drive slowly through the parks and along the state roads, that is his privilege, but he should keep well to the right.

It is the absence of courtesy, and even of common decency on the part of some motorists that is causing "No Trespassing" and "No Parking" signs to multiply along the much traveled routes in the country and at the seashore. The picnic party that stops in a pleasant grove by the roadside or on the beach in front of somebody's neat cottage to

eat a lunch contained in tin cans and papers, which are carelessly disposed of, not only makes the place unattractive for succeeding visitors, but, by often repeating the practise, causes the owner of the property to forbid the use of the locality. Such practises, noisy parties and other unpleasant actions have only recently led some towns to establish a 10-minute parking rule on its streets where motorists are accustomed to gather to enjoy the sea view and cool breezes that blow over the peninsula. Even in remote rural sections owners of land have been compelled to forbid the use of their land for motor picnic parties, but this is due less to the absence of courtesy than the lack of common honesty.

PROPOSE AUTO THEFT LAW AMENDMENT.

NEW YORK, Sept. 14.—A nation-wide movement to interest Congress in adopting an amendment to the Federal automobile law which now makes it a felony to take a stolen motor vehicle across a state line, has been started by the National Auto Anti-Theft Association.

The proposed amendment would prohibit the export of any auto until, and forbidding any steamship line to issue its bill of lading for the transport of any auto, whether or not boxed, until its motor and factory numbers are certified by an inspector of customs as intact (and recorded); and further certified not to be on the list of stolen autos to be required to be kept posted in the office of the collector of customs of each port of entry in the United States.

All trade organizations affiliated with the motor car industry throughout the country and every automobile club are urged to use their influence with their own congressman to secure the adoption of such an amendment to the present Federal law in order to close an important outlet of professional automobile thieves in exporting their spoils to confederates at foreign ports.

About 750 chambers of commerce, boards of trade and trade organizations and about 300 automobile clubs have been nominated as associates of the National Auto Anti-Theft Association. The joint cooperation of all for the enactment of legislation for the more uniform protection of car owners in the various states by concentrated effort carefully directed on uniform lines should be productive of good results.

Rail Car Swells Maine Central's Profits

THE Maine Central Railroad has placed in service something entirely new for this section of the country in the way of a "train" operating on the regular time-card schedule of the Bucksport branch, also between Bangor and Oldtown. It is practically a 42-foot steel trolley car—minus the trolley—of the combination type common on interurban lines, with a baggage compartment and seats for 38 passengers. If it was not on a railroad track it would hardly attract attention except for its large size.

The motive port is a 70 horsepower gasoline engine, four-cylinder, of regular commercial truck type. Like a motor truck the car is a "single ender." The power is transmitted to the four forward wheels only by the usual type of truck propeller shaft, but with a special auxiliary transmission, a shaft to each of the two axles. The rear trucks run "idle." The control is by a foot clutch, lever gear shift, sector spark and throttle and accelerator. Westinghouse air brakes are used, with auxiliary hand brakes, front and rear.

THE car is geared to a speed of 37 miles an hour on a level track and can be "hit up" to 48 miles an hour. It can climb a grade up to the adhesive power of the wheels. It will "pick up" 25 miles an hour in 30 seconds from a standing start, 29 miles in a minute and the maximum speed in a little over two minutes.

The important item of fuel consumption averages about the same as that of a heavy truck, five to six miles on a gallon of gasoline and engine oil no more than the normal

consumption of that type of motor.

The Bucksport branch, 20 miles, has been served by a round trip mixed train in the forenoon and a round trip passenger train in the afternoon. The motor car makes a round trip in the morning, the mixed train runs as usual, and the motor car takes the place of the steam train in the afternoon, giving an extra train on the branch—three instead of two—and saves the round trip of a two-car steam train.

After returning from Bucksport in the morning it makes a round trip

to Oldtown, 12 miles, giving an additional train in the Oldtown-Bangor service.

So it is that the new car provides two new round short trains out of Bangor and takes the place of one steam train on a 40-mile haul. The people along the lines served by it appear to be pleased, as it provides increased service and is comfortable. The men around the railroad for years call it the "flivver train," and assert that it will be good at bucking the snowdrifts in this section of Maine.

Chassis Design Important to Successful Operation

REPORTS from many transit companies successfully operating bus feeder lines, show a tendency toward the more careful analysis of chassis design to avoid some of the features considered correct in motor trucks as commonly used in commercial hauling.

Essentially, it has been proven that the ordinary

truck chassis is not satisfactory, and cannot be made to do double duty, especially in the specialized field of passenger transportation.

Traction companies may well profit by the investigations and extensive research on this matter carried on by the Republic Truck Sales Corporation under the direction of Ralph M. Sparks.

MR. SPARKS, an expert traction man, who heads the company's public utility division, approached the subject from a practical angle of one thoroughly versed in the particulars of conducting passenger service profitably, and with satisfaction to the traveling public.

The need for a specially designed chassis was early disclosed, with particular emphasis on the need for a low center of gravity, wide tread, sure stability and riding comfort under constantly varying loads.

It has been these attributes which the Republic Knight-motored bus has been so clearly demonstrating in a number of installations in various cities.

The comfort of the passenger is, of course, an element that every experienced railway man recognizes, and, Republic engineers have been giving special attention to this point. There is practically a complete absence of mechanical vibration in the Republic Knight-motored bus, due absolutely to the use of the Knight sleeve valve motor. This is the same type of motor that is used in the world's largest and most successful bus centers, London and New York.

Baltimore, Providence, Boston, New Haven, Youngstown, Newark and San Diego, Cal., transit and electric railway companies have installed Republic Knight-motored

buses, and other leading electric railway companies appear to be gratified at the progress made by Republic in learning the peculiar problems that must be solved in figuring how to initiate and continue supplementary passenger service by buses on profitable and satisfactory basis.

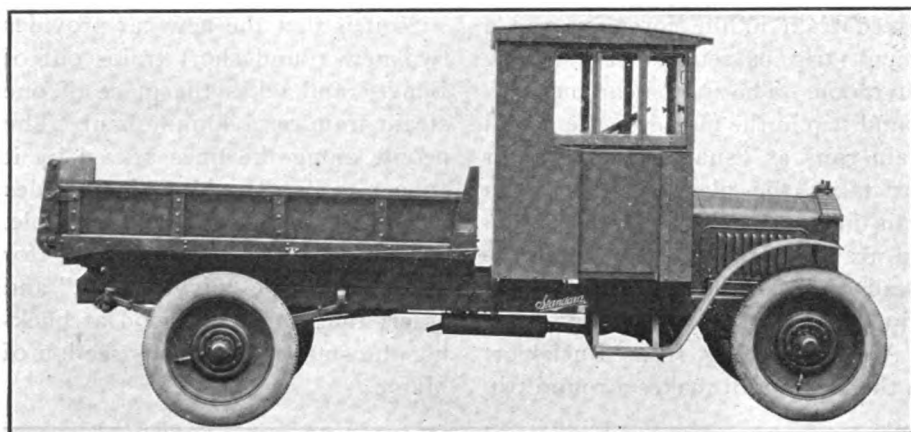
Carl D. Peterson has severed his connection with the H. J. Koebler Motors Corporation, Bloomfield, N. J., where he was chief engineer and factory manager. His plans for the future have not been announced.

Karl F. Walker has joined the engineering department of the Carter Carburetor Corporation, St. Louis. Until recently he was chief engineer for the Fedders Manufacturing Company, Buffalo, N. Y.

Standard Shows Another Quality Job

Pioneer Manufacturer of Motor Trucks Offers Model 75, a Low Priced Delivery Car Built Throughout of Finest of Specialized Parts.

AMONG the various manufacturers of highly efficient commercial vehicles the Standard Motor Truck Company of Detroit is known throughout the country as a builder of quality trucks. This company for many years has marketed a line of highly specialized trucks which have met with the approval of all classes of trade; therefore it was only fitting in view of the splendid record made during a period of years with larger models that the company eventually should put into production a light delivery car, and this model, long awaited, recently has been announced. Model 75 as the chassis is designated, sells for \$1330. It is designed primarily to meet the demand for all who have need for a light, speedy and wholly efficient delivery car.



A Convenient, Trouble-Proof Dump Body for Use with the Model 75 Chassis Recently Developed by the Standard Motor Truck Company.

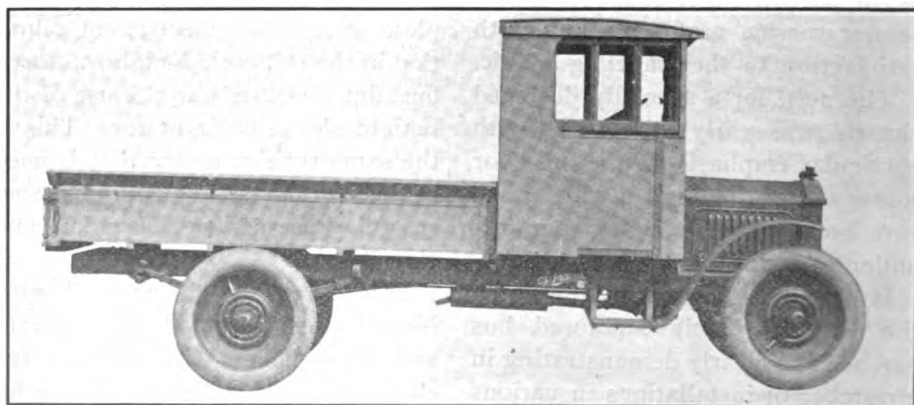
IT IS a high grade worm driven light duty chassis that is on a par with the other dependable units built by this well known manufacturer and contains the same line of standard parts that have been incorporated in the various models. These units, which have efficiently stood the tests of a long period of service were adopted by the maker because of their known dependability, no cognizance being taken of the cost of the various parts, which are among the highest priced manufactured.

The machine has a Continental engine, Timken bearings, Brown-Lipe clutch, Spicer joints, Eisemann magneto and a Stromberg carburetor. The Continental engine used to power the vehicle is a model N, $3\frac{3}{4}$, water pump; a motor which standard engineers, through many months of experimentation have found to be ideal for the work in hand. The Brown-Lipe multiple disc clutch, also thoroughly tested,

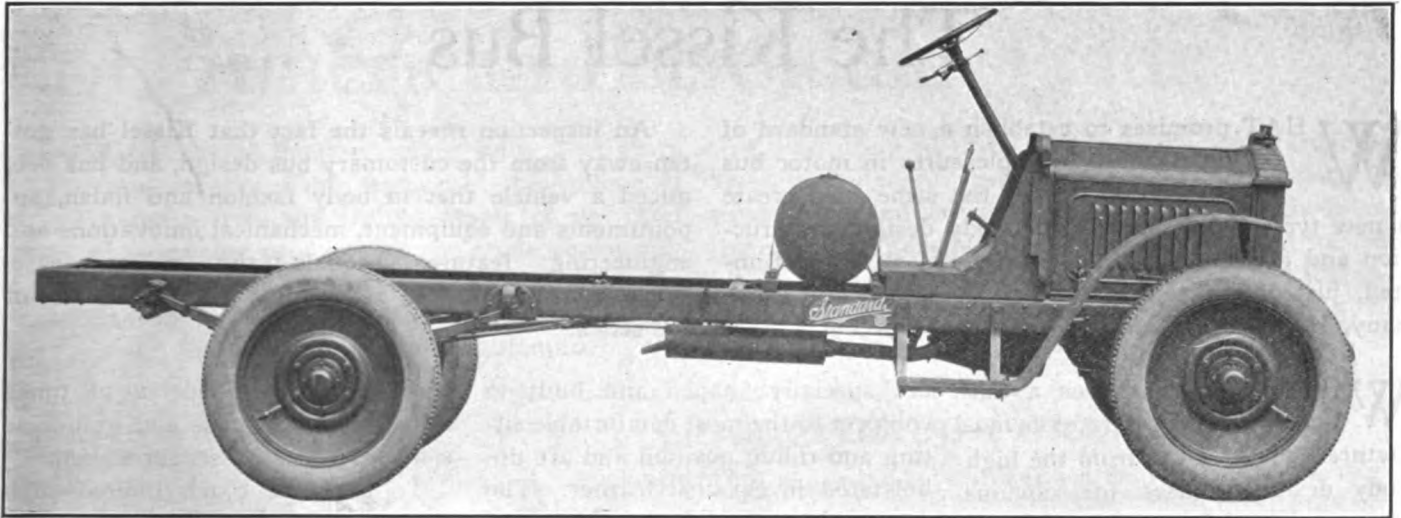
conveys the power through a two-piece Spicer propeller shaft and universal joint assembly to the Timken worm driven rear end, the axle equipment being Timken 1250 for the front and Timken 6250 for the rear. A most important member of the truck is the Ross steering gear, which is considered to be as nearly trouble proof as any now known to the trade. Pneumatic cord tires 33x5 on all four wheels, of the highest quality, are standard equipment.

Special alloys steel springs are used, these members being so designed as to assure ample strength, while at the same time enhancing the riding qualities of the truck. A particularly well known Standard feature and one which has met with the entire approval of Standard truck owners, is the all-steel seat and riser, which has given remarkably good service in the past. The vacuum tank installation is so constructed as to guarantee an uninterrupted flow of fuel to the engine.

Lubrication is the well known splash system which the company has tried thoroughly before installing. Cooling is by means of water pump installation, the radiator of the system being a vertical tube type with cast tanks. Internal expanding brakes lined with Timken standard woven asbestos and wire lining, having a diameter of 15 inches, are regular standard equipment. Distel wheels of the demountable type with a valve connection on the outside are standard equipment, while the front



Another Carefully Designed Body for Use with the 75 Chassis. The Special Standard Cab Illustrated Cannot Rattle Nor Loosen.



This Clean Cut Model 75 Standard Chassis Is Evenly Balanced to Withstand the Hardest of Strains and Stresses. It Is Heavily Powered by a Continental Engine and Is the Last Word in Efficiency.

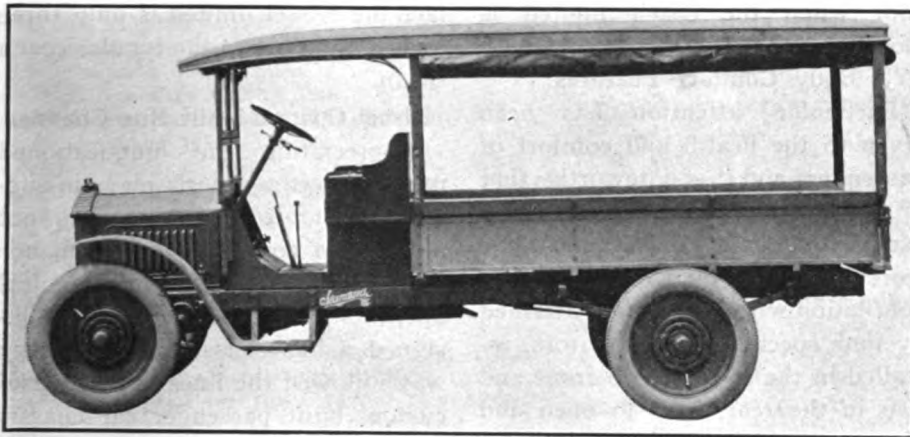
fenders, running boards, dash and tow boards all are of the heaviest pressed steel. Practically any type of body can be used with this chassis and the company invites communications from prospective pur-

lines of business which make use of a stake body. This model, as carefully built as the other, may be furnished with open or closed cab.

A one-yard dump body is available for the road building contractor

wholly trustworthy dump body of medium capacity.

The canopy top model is eight feet long and nearly four feet wide, with curtains which entirely enclose the loading space in the event of storm conditions. This body can be fitted with seats if desired and should prove a source of revenue to those owners who care to handle extra business after the day's work, such as carrying passengers on moonlight rides, running to and from amusement resorts or going on Sunday picnic excursions. It is especially well adapted for the use of the merchant who maintains a delivery fleet and should be highly favored by retail grocers, department stores and florists. It is splendidly adapted for use as a pick-up wagon for the contractor. It has a distinct place in the wholesalers' fleet as well and can be used by packing houses, fruit growers, milk farmers, produce dealers and many others.



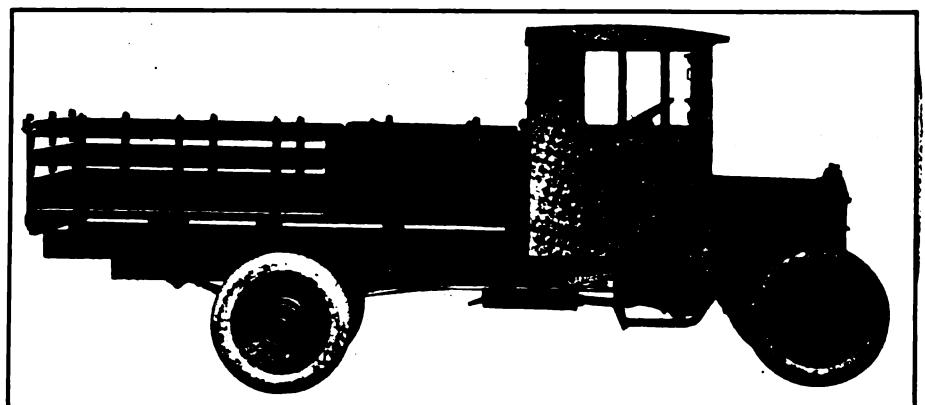
This Standard Delivery Car Has a Variety of Uses. Its Careful Construction Recommends It to the Attention of the General Retailer.

chasers as to proper types.

A popular body is the "Fast Express," which may be had with either open or closed cab. This body, carefully designed and well balanced, is staunchly built with an adjustable tail gate and flare board; it is especially well adapted for light expressing and used by hardware stores and packing houses, to say nothing of any number of other kinds of service to which it may be put.

For general haulage and light delivery a stake body with stake tail gate may be had, which is particularly well adapted for the general contractor, the general haulage operator, the farmer and similar

and also will find favor with mason contractors, foundation builders, coal yard operators and, in fact, a great many others who can make use of an ingeniously devised and



General Contractors Who Have Use for a Special Stake Body of This Type Will Find the Standard 75 Entirely Efficient.

The Kissel Bus

WHAT promises to establish a new standard of riding comforts and pleasures in motor bus transportation and at the same time create a new type of bus chassis and body design, construction and finish, is that of the new Kissel Coach Limited, just announced by the Kissel Motor Car Company, Hartford, Wis.

WHILE there has been a tendency on the part of manufacturers to get away from the high body designed buses for obvious reasons, Kissel has a specially designed chassis that is practically the same as that of his custom-built passenger car chassis with, of course, those necessary additions to take care of increased wheelbase and weight of a body of 18-passenger capacity, designed and built on coach sedan lines.

The easiest way to describe and compare the coach limited is that of asking our readers to imagine a specially designed sedan or limousine furnished and equipped completely as if built to order for the critical owner, who desires a de luxe conveyance capable of accommodating 18 of his most particular friends. It is as if a coach sedan from a 124-inch wheelbase vehicle with two seats and passenger capacity of six had been lengthened to a coach sedan of 202-inch wheelbase with five seats and 18 passengers capacity.

The coach body is custom built throughout and is produced in the Kissel custom shops by the same body designers and builders who produce the entire line of Kissel custom built automobile bodies.

It is hand made throughout with all silks, frames and body pillar connections specially designed, constructed and braced with angle irons that permit no body spreading or squeaking developing. All lumber used is specially prepared northern ash covered with 14-gauge aluminum. Entrance is made on the right hand side through four doors, each door opening directly into a seat of full sedan width and depth, with plenty of leg room for passengers' comfort. The seats and backs

are specially shaped and built to conform to the most comfortable sitting and riding position and are upholstered in Spanish leather. The seat backs are 24 inches high and are equipped with slumber rolls for added comfort.

All four doors are automatically locked when closed and can be opened only after the driver releases the catches by operating a specially designed lever. This device makes impossible a passenger opening the door when the coach limited is moving.

Body Comfort Features.

Particular attention has been given to the health and comfort of passengers and it is noteworthy that in providing different features many exclusive items and innovations were originated by Kissel. Perfect ventilation without drafts is attained by four special roof ventilators, installed in the roof, two in front and two in the rear, easy to open and close and which provide ventilation without drafts. Also 10 large windows can be lowered in addition to the windshield. The lighting system is composed of eight special dome lights in the ceiling, flooding the interior with an indirect light that is not only easy on the eyes, but permits reading with comfort.

For cold weather travel proper temperature is assured from four heaters so located that it is absolutely impossible for the interior to be heated in spots, the construction of the body being so that throughout the inside an even temperature will be maintained.

Perfect Roadability.

Kissel believes that to maintain riding comfort and safety at all speeds, a motor bus should be so designed and built that it is as smooth

An inspection reveals the fact that Kissel has gotten away from the customary bus design, and has produced a vehicle that in body fashion and finish, appointments and equipment, mechanical innovations and engineering features, equals the riding ease, operating smoothness, roadability and quietness of the sedan.

and comfortable a rider at all times on all kinds of roads and grades as a five or seven-passenger sedan.

To give the coach limited such perfect roadability Kissel employs a special 43-inch frame exactly the same in design as the regular Kissel custom built frame with a special kick-up for low body design and allows perfect distribution of balance and weight necessary to enable the car to hug the road without any side sway or skidding. In fact the Kissel limited is only three inches higher than the regular coach sedan.

Kissel Custom Built Bus Chassis.

Appreciating the unquestioned importance the chassis plays in successful motor bus operation, not only as to continuous performance and smooth riding, but economical operation, the Kissel engineers designed a bus chassis that in every way followed the lines of the Kissel custom built passenger car chassis as close as engineering fundamentals and practises permitted.

The special bus frame is 43 inches wide with eight-inch side rails of one-quarter-inch gauge and equipped with five cross bars. This special frame was scientifically determined as to resiliency and strength at minimum weight and, it is not only durable, but clean cut in every particular. To assure maximum spring flexibility semi-elliptic alloy steel springs are used in front, 38 by 2½ inches in size, and 60 by 2½ inches in the rear.

Both springs are equipped with the special Kissel side play adjustments that eliminate rattles or squeaks developing in the springs. Specially designed front and rear axles are used, while the brakes pos-

(Continued on Page 492.)

American Petroleum Trade

DURING the 12 months ending June, 1922, there was an appreciable decline in the volume of exports from the United States of the chief classes of petroleum products except crude petroleum, as compared with the preceding 12 months. Exports of gasoline and other light products declined 14 per cent., gas and fuel oil 14 per cent. and illuminating oil

and lubricating oil three per cent. each, while crude petroleum increased seven per cent. June exports of crude petroleum were 39 per cent. above those for June, 1921. Canada took 29,177,576 gallons of the crude oil exported during June, and 304,754,307 gallons of the 12 months' exports, the remainder going chiefly to Germany and Cuba.

EXPORTS of illuminating oil during June were somewhat above those for May, 1922, and for June, 1921, although still 22 per cent. below the April figure. Shipments of this item to the United Kingdom during the 12 months ended June declined 22 per cent. and those to China 19 per cent. Notable increases in the exports of illuminating oil during the last 12 months' period appear in the figures for Egypt, Italy, Germany and Argentina, shipments to these countries showing advances of 127, 95, 73 and 45 per cent. respectively.

Lubricating oil exports during June were nearly 10,800,000 gallons above those for the corresponding month of 1921, and 1,400,000 gallons above the May figure. The principal change in the volume of exports of this class of products for the 12 months ending June were in the shipments to Germany and France, which increased 104 and 26 per cent. respectively, and in exports to Sweden, Australia and the United Kingdom, which registered decreases of 75, 50 and 23 per cent. respectively.

Year's Exports of Gasoline and Fuel Oils.

The movement in gasoline and other light products, which had declined in May, showed a still further decline in June, although shipments were considerably above those for June, 1921. The principal features of the 12 months' exports of this class of products were decreased shipments to France, Italy, the United Kingdom and South American countries, and increased exports to Japan, the Netherlands and Belgium.

Gas and fuel oil exports for June showed a decline of about 9,700,000 gallons from the May figure and were nearly 9,000,000 gallons less than those for June, 1921. Shipments of this item to France, Italy, the United Kingdom and Canada registered decreases during the 12 months ending June as compared with the previous 12 months, while exports to Belgium, Denmark, Mexico, Japan and the Philippines showed marked increases. Imports increase.

Imports of petroleum products during the 12 months ending June, 1922, were somewhat above those for the corresponding period of the preceding year. Crude oil imports increased 93,336,568 gallons, while imports of benzine, gasoline and naphtha registered increases of 157 per cent. and of other refined products three per cent. June imports of benzine, gasoline and naphtha were nearly three times those for May, while receipts of other refined products and of crude oil were somewhat under the May figures.

Cooperative Financing

"AUTOMOTIVE exports will increase three-fold if stimulated by financing facilities based on collateral value of motor vehicles, deposit by foreign dealer, insurance of credit risk and provision for cooperative disposal by bank and manufacturer of any rejected shipments," according to G. F. Bauer, foreign trade secretary of the National Automobile Chamber of Commerce, who addressed the Motor and Accessory Manufacturers' Association convention recently.

"MOTOR vehicles represent definite collateral value, just as much as cotton, grain or securities. Recognition of this collateral value has been taken as far as domestic trade is concerned. A recent indication is the erection in Chicago of a warehouse, where motor vehicles may be stored by a dealer as collateral, on which loans are issued.

"In export financing, however, the collateral value of motor vehicles is seldom considered. A draft is discounted only as firm's standing warrants, regardless of the value that may be represented in the shipment.

"This attitude is probably because of too little cooperation between the manu-

facturer and the bank and a lack of understanding as regards each other's problems. Any improvement is, therefore, possible only in a plan that proves satisfactory to both. To the manufacturer it must offer protection from undue recourse; to the latter, sufficient collateral and guarantee that the goods will not be thrown on hands of banker alone for disposal.

"Negotiations are now on between the National Automobile Chamber of Commerce and certain bankers to devise a plan of this kind that will prove satisfactory all around. Based on cooperation between bank and manufacturer it would provide this:

1. Dealer puts up as guarantee of good faith 25 per cent. of value of shipment.
2. Manufacturer discounts draft for 80 per cent. of face value, leaving other 20 per cent. standing until transaction is completed.
3. Bank insures itself against credit risk and charges premium of about one per cent. for six months to manufacturer.
4. Interest on credit extension is charged to foreign dealer.
5. Control of vehicles as collateral guarantee is retained by bank until payment is effected.
6. Disposal of vehicles, if rejected, is provided for in cooperative arrangement between bank and manufacturer, whereby latter contracts to give preference to returned goods in filling of any export orders on books.

7. Expenses of returning to U. S. of rejected vehicle are amply provided for in guarantee of 25 per cent. put up by dealer and forfeited in event of rejection of goods for invalid reasons.

"The advantages from such a cooperative financing plan are manifold. The manufacturer is relieved of recourse. The bank avoids going into automobile merchandising, and if desired, could assume credit risk and collect premium for its own account. The dealer would have chance to sell vehicles before paying draft; but one-quarter of present amount would be required to finance shipment from factory to destination; the credit with his local bank could be conserved for use in intensive sales development or in creating greater turn-over with resultant benefits to all from larger volume of business.

"If then, cooperation will help us all in extending our foreign commerce, why not resort to it generally in advertising, selling and servicing."

TRUCKS SAVE FARMERS TIME ACCORDING TO SURVEY.

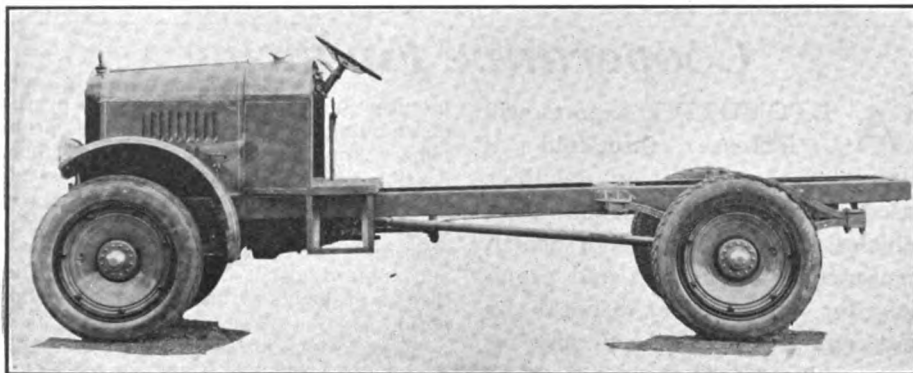
NINETY per cent. of the farmers who responded to the survey made by the U. S. Department of Agriculture state that the factor of time saving is the greatest advantage of trucks over horse-drawn vehicles. Even on short hauls the motor truck requires only about half the time needed to make the same trip by wagon.

Indiana Highway Express

A NEW Indiana one-ton speed truck, known as the "Highway Express," will make its appearance on the market shortly, according to an announcement just made by the Indiana Truck Corporation, Marion, Ind.

The new one-ton Indiana, which will sell at \$1425,

will embody several new features in speed truck construction, it is announced. The new job has been out in actual work and demonstration for several months, and the factory is preparing to swing in quantity production. The rear axle is a spiral bevel drive, semi-floating type.



A Specially Designed Pressed Steel Frame Is a Feature of This New Indiana.

THE motor is a special Waukesha, built under the direct supervision of the Indiana Truck Corporation; the bore is $3\frac{3}{4}$ by $6\frac{1}{4}$, three-bearing crankshaft, size of bearings, front, 2 by $2\frac{1}{4}$; center, 2 by $2\frac{1}{2}$; rear, 2 by 3; connecting rod bearing, 2 by $2\frac{1}{4}$; piston pin bearing, 1 by 2.

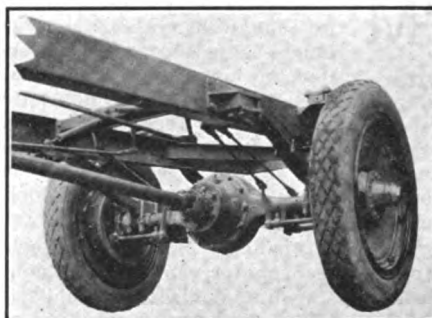
The truck will be equipped with indestructible disc steel wheels, and 34 by 5-inch pneumatic tires all around, with electric lights and starter, which will be standard equipment.

A special designed pressed steel frame is one of the features of the new Indiana speed truck. Some unique features in trussing and gusseting have been employed. The frame is of pressed steel construction $5\frac{7}{16}$ inches deep, with $3\frac{1}{4}$ -inch flange.

The spring construction is three-quarter elliptic type, both front and rear, the principal features of which are the arrangement of the leaves, and the elimination of all shackles and ground bolts. No lubrication is necessary. This type of spring is said to be especially advantageous for a speed truck, as it gives added protection to the load, the drive is through the springs and the driving strains are carried by a number of

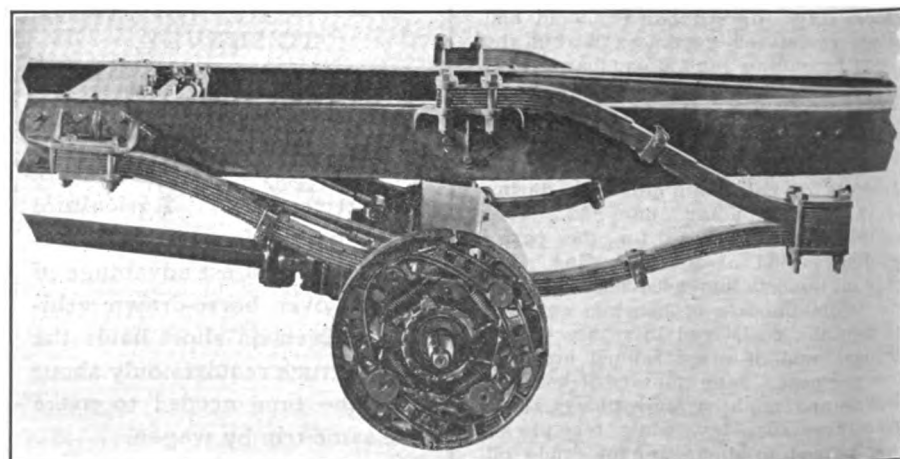
main plates instead of one main plate in the conventional type.

The truck already has proved its ability at numerous kinds of work,



An Unusually Rugged Rear End Assures Ability to Stand Hard Usage.

distributors are now taking orders and shipments already have been started.



The Unusual Springing Is Claimed to Give Superior Riding Qualities.

SPECIFICATIONS.

Motor—Special Waukesha, four cylinders, $3\frac{3}{4}$ to $5\frac{1}{4}$ inches; three bearing crankshaft, size of bearings, front, 2 by $2\frac{1}{4}$; center, 2 by $2\frac{1}{2}$; rear, 2 by 3; connecting rod bearing, 2 by $2\frac{1}{4}$; piston pin bearing, 1 by 2. All bearings except piston pin are oiled by force feed system with gear pump. All main connecting rod bearing, round shell, babbitt lined. Centrifugal pump for circulating water.

Clutch—Dry plate type, Raybestos and steel plates, completely enclosed in housing.

Transmission—Brown-Lipe model 30, unit power plant, three speeds forward and one reverse, low gear ratio of four to one.

Front Axle—I-beam section, $1\frac{1}{2}$ by $2\frac{1}{2}$, spring pads forged integral with bed, spindle 12 inches in diameter with wheels mounted on Timken roller bearings.

Rear Axle—Spiral bevel drive, semi-floating type, Timken roller bearings throughout, diameter of drive shaft 2-1.8.

Brakes—15 inches in diameter by $2\frac{1}{2}$ inches wide, Timken duplex internal expanding brakes on the rear wheels. Rear axle drive pinion has the straddle bearing mounting, which serves to cut down the load on the pinion shaft bearings.

Springs—The Laycock one-quarter elliptic type, $2\frac{1}{2}$ inches wide, front and rear, made of silicon manganese alloy steel. Rear springs take both the drive and torque reaction and are very well adapted for this class of work, as the drive is taken through six main plates instead of one main plate as in the conventional form of Hotchkiss drive.

Radiator—Is of pressed steel shell, with removable core.

Wheels—Are disc steel, equipped with the Firestone steel felloe band, which mounts a demountable rim.

Tires—Are 34 by five pneumatic cord, front and rear.

Carburetor—Stromberg.

Gas Control—By hand lever on steering wheel and by foot accelerator, with a choker wire mounted on the instrument board.

(Continued on Page 492.)

New York Buys 128 More Whites

A CONTRACT for 128 five-ton motor trucks, just awarded by the City of New York to the White Company, Cleveland, following a previous order for 212 trucks of this make some time ago, gives the White Company the two largest orders for motor trucks ever placed by a municipality and gives the street cleaning department of the City of New York the largest known fleet of standardized heavy duty trucks.

Specifications required bidders to produce verified records showing at least 100 heavy duty trucks which have covered more than 75,000 miles. This requirement was a simple one for the White Company, which qualified in this respect two years ago.

One hundred and twenty of the



Power Dump Bodies Will Equip Fleet of Whites Purchased by New York City.

trucks will be equipped with power dumping bodies developed especially for refuse collection under the conditions existing in New York. Each will carry six yards of refuse.

They will be used for all phases of street cleaning work, including the removal of ashes, garbage and snow. Six will be provided with winches and two will be equipped with apparatus for handling wrecks.

New York City has found motor trucks essential in keeping its thousands of miles of streets in a sanitary condition. The city has a nation wide reputation for clean streets and because of the constant growth of the street cleaning problem, large investments in motor equipment have been necessary. To protect the city against the blocking of thoroughfares by heavy snow falls, such as happened two years ago when New York traffic was paralyzed for days, a method of attaching snow plows to the front of the trucks was developed and, on short notice, the city can throw into service a great battery of snow fighters.

BERKSHIRE TRANSPORTATION COMPANY STARTS.

WORCESTER, MASS., Sept. 2.—The Berkshire Transportation Company made its initial trip the other day and carried a total of 120 passengers on the three round trips made between this city and Springfield by way of Spencer, Warren and Palmer. Executives of this company have stated their intention immediately to establish routes to other nearby towns and cities, all of which will result in a bus line system that will be one of the largest in the country.

Especially designed vehicles are used which are very easy riding.

SHORT LINE RAILROADS USING MOTOR BUSES WITH FLANGED WHEEL EQUIPMENT.

Name of Railroad	State	Distance
New York, New Haven & Hartford.....	Connecticut	104 Miles
Greater Northern, Northern Pacific.....	Oregon	35 Miles
Cleveland, Cincinnati, Chicago & St. Louis...	Indiana	84 Miles
Baltimore & Ohio.....	Maryland	
Narragansett Pier.....	Rhode Island	8 Miles
Aberdeen & Rockfish.....	North Carolina	60 Miles
Central West Virginia & Southern.....	West Virginia	32 Miles
Sewell Valley.....	West Virginia	46 Miles
Mt. Hood.....	Oregon	22 Miles
Virginia & Truckee.....	Nevada	31 Miles
Nehalem River.....	Oregon	35 Miles
Tonopah & Gold Field.....	Nevada	31 Miles
Hetch Hetchy.....	California	69 Miles
Atlantic & Western.....	North Carolina	25 Miles
Carrollton & Worthville.....	Kentucky	10 Miles
Stone Harbor.....	Virginia	4 Miles
Greenbriar & Eastern.....	West Virginia	10 Miles
New Mexico Central.....	New Mexico	116 Miles
Gilmore & Pittsburgh.....	Montana	100 Miles
Winchester & Western.....	West Virginia	40 Miles
New Orleans & Lower Coast.....	Louisiana	60 Miles
Palatina, Lake Zurich & Wauconda.....	Illinois	16 Miles
Chesapeake Western.....	Virginia	41 Miles
Pittsburgh & Shawmut.....	Pennsylvania	103 Miles
Kanawha Glen Jean & Eastern.....	West Virginia	14 Miles
Pittsburgh & Susquehanna.....	Pennsylvania	13 Miles
Morristown & Erie.....	New Jersey	10 Miles

—Courtesy National Automobile Chamber of Commerce.

Truck Freight Rates

(Continued from Page 474.)

Commodities	Unit Basis.	1 Mile to 15 Miles	16 Miles to 35 Miles	36 Miles to 60 Miles	61 Miles to 80 Miles	81 Miles and Over
Barrels, oil (returned).....	100 lbs.	.25	.25	.25	.25	.30
Bottled goods	100 lbs.	.50	.55	.60	.70	.75
Brick, packed in barrels, boxes.	100 lbs.	.25	.30	.35	.40	.45
Building material (wooden)....	100 lbs.	.60	.65	.70	.80	.85
Canned goods (in cans).....	100 lbs.	.50	.55	.60	.70	.75
Carbide of calcium	100 lbs.	.50	.55	.60	.70	.75
Cement	100 lbs.	.30	.35	.40	.50	.55
Coal (in sacks)	100 lbs.	.35	.40	.45	.60	.65
Coca-Cola	100 lbs.	.50	.55	.60	.70	.75
Coca-Cola (in bbl.).....	100 lbs.	.50	.55	.60	.70	.70
Coops, patented	Each	.25	.25	.25	.25	.25
Coops, homemade	100 lbs.	.30	.35	.40	.40	.40
Crates, bottled goods (empties)	100 lbs.	.35	.40	.45	.50	.55
Drain tile and clay pipe, packed	100 lbs.	.40	.45	.50	.60	.65
Fish, salt, in barrels or kegs....	100 lbs.	.40	.45	.50	.50	.55
Fish, fresh packed.....	100 lbs.	.50	.55	.60	.60	.65
Gasoline	100 lbs.	.50	.55	.60	.70	.75
Hardw'e & auto. parts (boxed)	100 lbs.	.50	.55	.60	.70	.75
Horse shoes and nails.....	100 lbs.	.30	.35	.40	.50	.55
Ice	100 lbs.	.50	.55	.60	.70	.75
Ice cream	100 lbs.	.50	.70	.75	.85	.90
Ice cream tubs (returned).....	Tub	.25	.30	.35	.50	.55
Iron articles, weighing 100 lbs.						
or more	100 lbs.	.40	.45	.50	.60	.65
Iron galvanized, boxed or crated	100 lbs.	.50	.55	.60	.70	.75
Laundry, in bags, boxes, or crts.	100 lbs.	.40	.45	.50	.60	.65
Lime (packed)	100 lbs.	.40	.45	.50	.60	.65
Lumber (not over 14 feet long)	100 lbs.	.30	.35	.40	.50	.55
Machinery (packed)	100 lbs.	.50	.70	.75	.85	.90
Molasses (in barrels).....	100 lbs.	.40	.45	.50	.60	.65
Nails and spikes (in kegs).....	100 lbs.	.30	.35	.40	.50	.55
Oil, coal (in barrels).....	100 lbs.	.30	.35	.40	.50	.55
Oil, lubricating (in barrels)....	100 lbs.	.40	.45	.50	.60	.65
Oil barrels (returned)	100 lbs.	.25	.25	.25	.25	.25
Oysters, shucked in cans (in barrels)	Per gal.	.08	.08	.08	.10	.10
Oysters in shell (in barrels)...	100 lbs.	.40	.45	.50	.60	.65
Paint	100 lbs.	.50	.55	.60	.70	.75
Paper bags	100 lbs.	.50	.50	.55	.60	.70
Paper, wrapping	100 lbs.	.50	.50	.55	.65	.70
Pickles (in barrels or kegs)....	100 lbs.	.50	.55	.60	.70	.75
Roofing material (prepared)...	100 lbs.	.50	.55	.60	.70	.75
Salt	100 lbs.	.25	.30	.35	.40	.45
Shingles	100 lbs.	.50	.55	.60	.70	.75
Soda water (in tanks).....	100 lbs.	.50	.85	.90	1.00	1.25
Soda water (in crates).....	100 lbs.	.50	.55	.60	.70	.75
Tar (in barrels)	100 lbs.	.35	.40	.45	.55	.60
Tobacco, unmanufactured	100 lbs.	.50	.55	.60	.70	.75
Tobacco, cigars and cigarettes.	100 lbs.	.50	.75	.80	.90	.95
Wire fencing (in rolls).....	100 lbs.	.50	.55	.60	.70	.75

THE KISSEL BUS.

(Continued from Page 488.)

sess special braking surface to produce greatest braking efficiency.

Kissel Custom Built Motor.

A 61 horsepower Kissel custom built motor powers the coach Kissel bus limited at 35 miles per hour. This motor is designed and built completely in the Kissel shops and is especially designed for smoothness of operation at almost total absence of vibration even at top speeds. The oil supply is automatically regulated by the speed of the motor, while the cooling system has a special Kissel installed thermostatical control that maintains an even temperature in winter and summer alike.

Throughout this motor every moving or stationary part is perfectly balanced, every piston weighs the same as every other in the same engine, every rod is matched exactly with every other rod, even to actually matching the weight of both ends, while the crank shaft is balanced both statically and dynamically.

INDIANA TRUCK.

(Continued from Page 490.)

Ignition—Ignition is Bosch generator and distributor with Presto-Lite battery.

Speed—The maximum speed is from 30 to 35 miles per hour. The truck will do 33 miles per hour at 2000 revolutions per minute.

Capacity—Is 2000 pounds, with a body weight allowance of 900 pounds.

Wheelbase—132 inches.

Frame—Is of pressed steel construction, 5 7/16 inches deep, with a 3 1/4-inch flange. The distance back of the driver's seat to rear end of frame is 98 inches. The distance back of driver's seat to center line of rear axle is 59 1/4 inches. The width of frame is 34 inches and the clearance between wheels is 50 inches.

Drive—The drive is taken by means of a single propeller shaft of 2 1/4-inch tubing, with universal joints at each end, connecting the transmission, which is mounted on the motor, with the rear axle.

Steering Gear—Is of the worm and nut type, with 18-inch hand wheel.

Control—The steering wheel is located at left side of car, arranged for fore and aft steer. Gear shift lever and hand brake is in the center of car.

Gear Ratio—6-1.9 to 1.

Gasoline Tank—Located in cowl with capacity for 15 gallons.

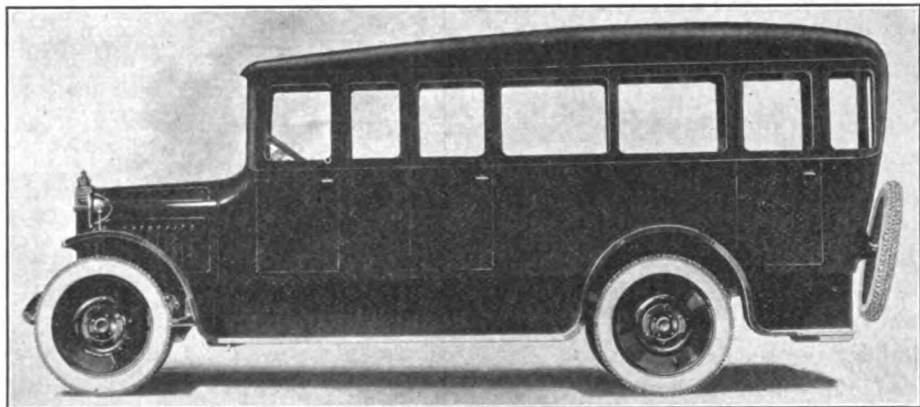
Performance—In actual tests have shown oil assumption running 700 to 800 miles per gallon, and 13.4 miles per gallon of gasoline, and an acceleration from two to 30 miles per hour in 25 seconds, with a total weight of 7000 pounds.

Standard Equipment—Electric lighting and starting, motometer, front fenders, stirrups, tool kit, jack, electric horn and one spare rim.

Standard Adds a Char-A-Banc

L AID out along lines adopted by the various London omnibus companies for long distance transportation, the Standard Motor Truck Company's new Char-a-Banc mounted on the model 75 truck chassis has attracted the favorable attention of the industry. It is an unusually beautiful job, the balance appears to be perfect and it is stated that the riding qualities are unsurpassed.

It is especially well built, in appearance being like the finest sedan; is luxuriously appointed, has very comfortable seats and undoubtedly will be widely adopted. The model



This Standard Char-a-Banc Carried on the Standard 75 Chassis Is Said to Be Unusually Comfortable, Speedy and Easy Riding.

75 chassis, which is built of the finest grade of materials, comprising highly specialized parts, is pecu-

liarily well adapted for carrying the body. The price announced for this job is \$2500.

OWNER SHOULD USE TIRE OF RIGHT SIZE

WHEN solid tires have not given service, rather than apply new tires, assuming that the old tires have failed due to some manufacturing fault, it would be well to investigate the service the truck is being operated in. If the load the truck is called on to carry is found to be in excess of the normal rated capacity of the truck, or exceeds the

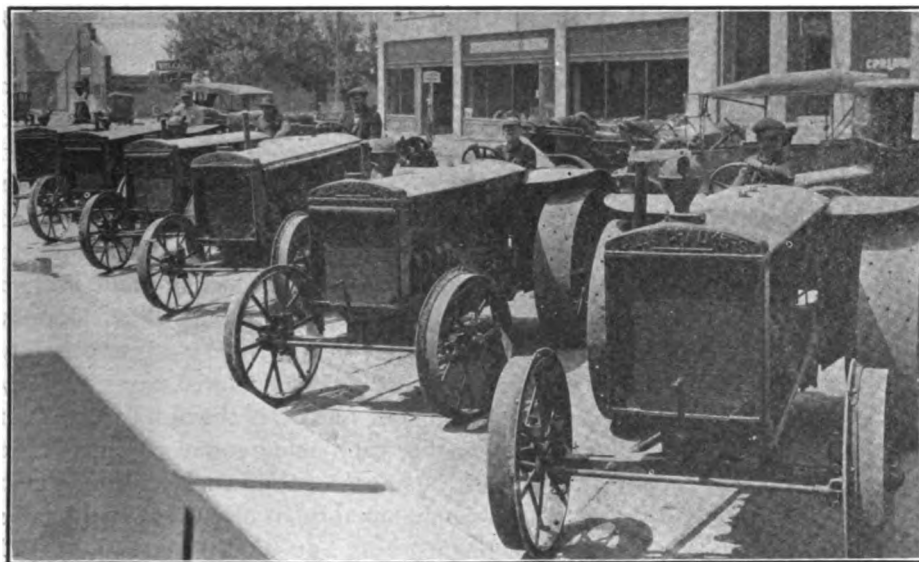
maximum carrying capacity of the tires, the more satisfactory course is to change the tire for a size or type that will meet the conditions as found.

The limitation of each size and type of solid tire is pretty well established, and if these limitations are exceeded a larger size or a different type of tire will quickly correct

the faulty service and an improvement in tire mileage will soon be noted.

The service rendered by solid tires is largely dependent on three factors: The speed at which the vehicle is driven, the load transported and the type or conditions of the road over which the vehicle operates. When determining tire sizes for original equipment, these three items as a rule are given careful consideration by the truck manufacturers and the correct tire size is carefully estimated. The original tire equipment as fitted to the vehicle thus is usually of ample size to meet the average user's requirements and will give satisfactory service as long as the vehicle is operated and loaded to its normal or rated capacity. If either the vehicle speed or its load exceeds this normal rate some change must be made in the tire equipment; either a change in tire type or an increase in tire size to take care of the extra demands made on the tires.

SELLS TRACTORS, SIX AT A TIME



Anderson & Skonnord, Valley City, N. D., Had a Special Farmer Tractor Delivery Day July 22, and Turned Off the Six 20-35 Allis-Chalmers Tractors Shown in Photograph Herewith, to as Many Farmers in That Vicinity. Note the Owners Are on Their Tractors Ready for the Parade into the Country. It is Expected That North Dakota Will Produce a Larger Tractor Business in 1922 Than She Has Produced During Any Year for the Past Half Dozen Years.

F. M. Vandervoort has become engineer in charge of design and production methods with the Baker Steam Motor Car & Manufacturing Company, Pueblo, Co. He was until recently manager and part owner of the Liberty Motor Shop, Springfield, Mo.

EVERY KNOCK IS A KNOCK.

(Continued from Page 468.)

His truck was a little heavy for my use, but we don't get much pleasure out here in the sticks so I climbed aboard the truck and off we started, me figurin' that if I didn't get nothin' out of it but a ride the time would be well spent. I wanted to use whatever truck I bought for hauling rockweed for fertilizer in the spring; this is a petty heavy jag for a truck so I asked the fellow to take me down over the beach road and let me see her pull with a fair load on, which he done, and I was quite pleased, take it all around, with the truck, and might have bought if he had been the first fellow to show up. But I knew a few things about trucks by now, so planned to go easy, figurin' that in all probability the machine had some hidden faults the same as the other two had, even though it appeared to be the right thing. Still the fellow might have sold me except that on the way back from the beach I happened casual like to mention that I had been thinking of buyin' one of the other two makes and had even went so far as to have a demonstration of each one—and the news acted on him just the way it had on the others. He went in a minute from a smooth talkin', nice, clean cut young fellow to the other extreme—immediately he stopped tryin' to sell me a truck and started in to pan out the other two makes.

"'Whatever you do, don't you never, so long as you live, buy one of them trucks,' says the fellow. 'They're nothing less than travellin' junk piles; haven't got a wheel under 'em and the engine of neither one of 'em wouldn't pull a hummin' bird off a clutch of eggs,' says he. 'They ain't neither of 'em,' he says, 'that could be called a specialized nor neither a one-make truck—they drink gas like a congressman does champagne,' says the feller, 'and when it comes to makin' 'em look like an'thing for more than a week they ain't there because the paint comes off in chunks as big as my head and fully as thick.' Well sir, so far this fellow was absolutely and

MOTOR VEHICLES AID FARM STUDIES AT UNIVERSITY.

MOTOR vehicles are used for many agricultural purposes at the University of Missouri.

A runabout is used by field representatives of the Department of Entomology for nursery inspection. A delivery wagon and a runabout are employed by the Horticultural Department for handling orchard and garden products.

Three touring cars serve the College of Agriculture in making soil surveys. A heavy truck is used for demonstration trips in the Agricultural Extension work. A runabout is provided for the superintendent of the hog cholera serum plant. Several additional cars and trucks are used for general purposes.

by far the worse panner-out of the lot; the way he layed them poor trucks down and stomped on 'em was a holy caution. He grabbed 'em and turned 'em inside out; took the gas tanks for tomato cans and bent the chassis up into hairpins speakin' figurative. Well I didn't buy no truck off the last fellow—guess I was wise I didn't because the very next week along came a fourth fellow with another truck—a regular eltrocutionist for speakin' his piece—who panned the life out of the other fellows' product and even added a few fancy frills about the general moral character of the salesmen themselves (something the other fellows hadn't thought to do), stating that the first two was single taxers and the third a kerosene snuffer.

"By this time I seen that none of these trucks—nor probably any others—wasn't any good and I just set back and enjoyed the fun. First along would come one salesmen and pan the other; the next day the second fellow would happen by and he would pan out the rest of them; neither one appeared to have

an'thing in mind about sellin' me trucks, but was more interested in seein' that the other fellow didn't cheat me.

"'Twas right down considerate of 'em, thinks I.

"I still hadn't got over the idea of having a truck some time though even if the salesmen had done their best to wean me away from the idea. But I didn't want to be too hasty. P'raps they'll be makin' 'em better in a few years, says I. Still they look good now. Tell the truth, I didn't know what to think. Finally one night I set down on the stone wall and starts to reason it out. I says to myself—alone in the dark—about 9 o'clock 'twas—'the Wilgo truck,' says I, 'is what the boys call a lemon. I got that much from good authorities. The Autogo truck is worse. Probably isn't a truck at all, but just a passenger car made over, like the salesman said. I got that on good authority, too—a fellow right in the business, so that truck's eliminated. As for the Cango truck, it's made of old sewing machine parts and rusty railroad trestles,' says I to myself, 'while the last one which was called the Mightgo is probably the worst of the lot, accordin' to the Wilgo salesman who used to work for the Mightgo people and left them because their trucks was so poor. All in all,' I says to myself, 'it's fine mess I'm let in for if I buy a truck and I can easy see it.

"Well I sat there and chewed a plug or two of Dark Brown and smoked up nigh on to another hand of it just a thinkin' out the matter from every angle. Finally I decided that the proper and sensible thing to do was to **buy no truck at all**. When I made this decision, which I ought to have done before, I felt happy again and considered myself lucky to get out of it the way I had. If the very men connected with the business—good conscientious men presumably, or else they wouldn't be working at their good jobs—all agreed that the business was no good—that in effect practically all trucks was rotten, it certainly

(Continued on Page 496.)

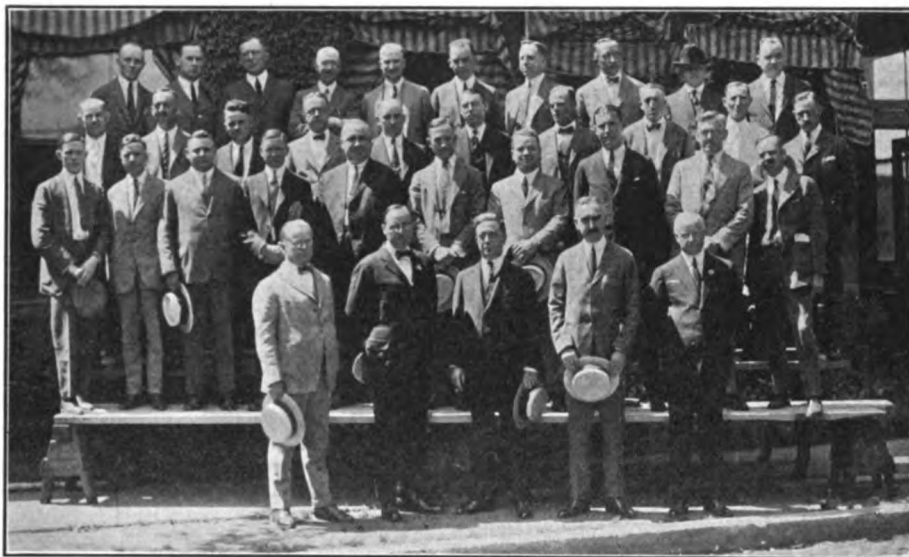
Industrial Motors Executives Meet

"THERE is an opportunity before Selden and Atlas men now that comes to very few men.

There is as big a future in store for the Industrial Motors Corporation as for any other organization in the country." So said Geo. C. Gordon, president of the Selden Truck Corporation of this city, while opening the big three-day conference of Selden-Atlas men, held at Rochester, N. Y., July 20, 21, 22.

"The Industrial Motors Corporation is headed by such men as John J. Watson, Jr., Frederick M. Small and Reeve Schley—men who have never failed to make good." And Mr. Watson says the new organization will be his greatest work." We have the opportunity, we have the goods, we have the men—and we will make good." These were further remarks in Mr. Gordon's talk.

The Division Sales Managers and Branch Managers of the Atlas Truck Corporation, York, Pa., Gathered with the Selden Field and Home Office Organization at Rochester, N. Y., for a Three-Day Conference Recently. At This Meeting the Control of the Atlas Organization Was Turned Over



by Mutual Consent, to H. T. Boulden, Selden Vice President, Who Is Sales Director of Industrial Motor Corporation. Officers in Front Row Are H. T. Boulden, G. C. Gordon, Selden President; Allan Costrove, Atlas Vice President; W. C. Barry and R. H. Salmon, Selden Co. Vice President.

THE Industrial Motors Corporation, a holding company, was organized with a view of putting the motor truck industry on real, solid foundation, by merging the interests of many manufacturing concerns. The Selden Truck Corporation of this city, and the Atlas Truck Corporation, York, Pa., were the first companies to enter. The Selden truck, a true "Quality City" product, enjoys an international reputation for heavy duty truck quality and the Atlas truck is as well known in the speed truck field.

The truth of Mr. Gordon's remarks was brought out forcibly, as the Selden-Atlas conference progressed. For years it has been the custom of the Selden Truck Corporation to call twice a year a conference of all field men. This practice will be continued under the Industrial Corporation.

Much credit for the success of this conference must go to Hal T. Boulden, vice president of the Selden Truck Corporation, and sales director of the Industrial Motors Corpora-

MOTOR TRUCK COMMITTEE GETTING RESULTS FROM CIVILITY CAMPAIGN.

GREATER civility on the part of the one million motor truck drivers in this country is anticipated from now on by reason of the excellent response that has been made to the educational campaign being carried on by the National Motor Truck Committee of the National Automobile Chamber of Commerce. The pamphlet that is being used in the campaign, "Common Sense on the Highway," has already reached a circulation of 125,000 copies among truck manufacturers, dealers and fleet operators. Requests for additional copies are being received daily from some of the largest truck users who commend it in highly favorable terms.

tion. Mr. Boulden presided at all meetings and the men in attendance say they never received so much real "stuff" before.

During the various sessions all phases of the motor truck business were discussed, from the angles of the manufacturer, the field men, the dealer, the local salesmen and the owner. From all points of the country reports were made that business was on the up grade. No one predicted any great sudden development, but rather a steady, sure increase in business to a point where prosperity was assured.

One part of particular interest was the discussion of the motor bus possibilities. The motor bus is here to stay, it has a real duty to perform and a sure place in the transportation system. After a ride in the new East avenue bus line Seldens the visitors agreed that no such bus is in operation anywhere. To date it is the last word in passenger-carrying motor trucks, and a big demand for this Selden model is sure to come.

EVERY KNOCK IS A KNOCK.

(Continued from Page 494.)

looked foolish for me to be putting my judgment against theirs so I decided that I was lucky to get off the way I did—and I still got my truck money in the bank,” concluded the farmer as he shot a mouthful of the aforementioned “dark brown” at a passing Plymouth Rock rooster who had been an interested listener to the conversation.

* * * * *

The foregoing narrative, though somewhat elaborated, is founded on an actual fact. It shows just one instance of the thousands of sales that are lost or delayed through the ill-directed efforts of the very persons who should be most interested in boosting the industry at every possible chance. Think it over and then contrast it with the following incident which occurred in Cleveland, where I was recently called on a business trip a short time ago. Just notice how easy it is to boost.

Early one evening prior to going into the hotel for dinner I had lighted a cigar and was strolling somewhat aimlessly about the streets. Attracted by a particularly fine looking automobile with a special body that was the last word in style and comfort, I mingled with the crowd and inspected the machine which, incidentally, was said to have cost \$18,000. As we stood taking in every detail of the job the owner of car elbowed his way through the jam, got into the machine and drove off. The gathering dispersed quickly as such crowds do until there were but two of us left, an elderly man and myself. This man asked me for a match (which I didn't have) and we got into conversation. It developed that he was working as a machinist in one of the automobile plants in Cleveland and finding that he had been the rounds of the different factories during his 20 years in the business I began questioning him as to which car in his opinion was the best.

He didn't answer me specifically as I had expected he would, but said:

“I can take any car made and run it for 10 years at a mighty small cost; they're all good, even the lowest priced ones, provided they get plenty of grease and oil and are used as they were intended to be. I don't know of a bad one in the whole lot—they're got to be right to get by nowadays—and 90 per cent. of the mechanical trouble that people have with them is their own fault. An automobile is about the most highly developed piece of machinery we have these days.”

And just because this man, a worker in the factories where cars are built, and a man who presumably should know all about them, had boosted all makes of cars, I somehow felt more strongly than ever that the automotive industry, just as I have always thought, is conducted on high business principles, that it turns out superior products all the way from the highest to the lowest priced machine and that any faults that may develop are almost entirely due to careless usage on the part of the driver. Here was irrefutable evidence—the word of one who knew the mechanical end of the business from every angle—a man whose word should go far to convince the most sceptical.

* * * * *

“Every knock is a boost,” says the aphorism. It sounds pithy and has a ring to it that in a sense is convincing—yet it's as far from truth as it possibly can be.

The plain unvarnished fact of the matter is that every KNOCK is a KNOCK—simply that and nothing more.

True of any business, it is essentially the fact with regard to the automotive industry where loose talk regarding the other fellow's product has done immeasurable damage in delaying sales, many times holding them up indefinitely; it is a positive truth that there are hundreds perfectly able to own cars who do not possess them just because over-enthusiastic “salesmen,” in the mistaken belief that they are boosting their own business have knocked the cars handled by others to an extent

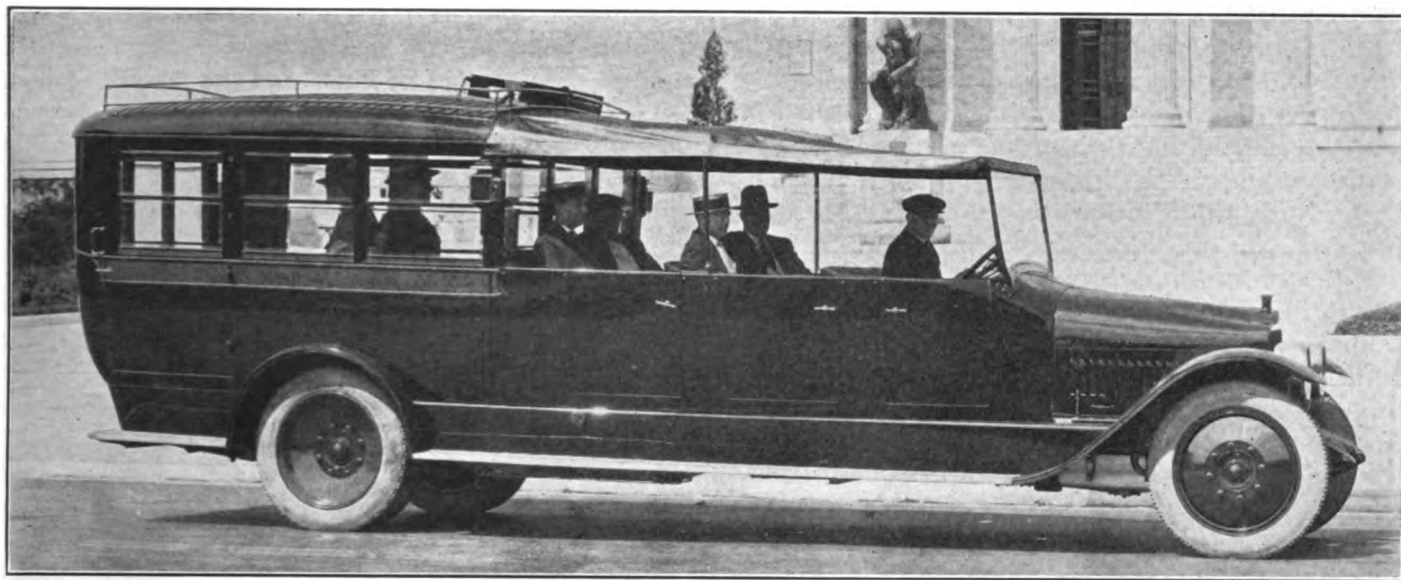
that the prospect has become prejudiced against the entire industry, and I am personally acquainted with cases that offer proof that this is true.

Growing by leaps and bounds since its inception the automotive industry has attracted unusually intelligent men to its ranks; men whose constructive efforts have accounted for the entire success of the business. These highly efficient executives have judged carefully, planned thoroughly and throughout the 20 odd years that the business has been recognized have carried it along in praiseworthy manner. **They realize that the success of the business lies in the good-will of the public and that because of the value of this good-will and the necessity of keeping it intact, every man in the industry, regardless of personal feelings or petty hatreds engendered by competition must have a good word at all times for any and all makes of cars and trucks regardless of who builds or sells them.** Whether delivered in an abstract way or specifically directed toward an individual automobile or truck the boost for one is a boost for all and in every sense specifically aids the booster himself, whereas a knock never can be anything but a knock, and by the widest stretch of imagination cannot pass for a boost.

In summary, there are two good reasons why every man, however remotely connected with the trade, should seek to advance it in every way possible; one is that by so doing he is helping to put the industry on a higher plane, the other (a mercenary one), because everything that he does indirectly to further the interests of the industry directly benefits the man himself. Therefore, let's all boost; let's forget that ill-conceived axiom about every knock being a boost, because we know that every KNOCK is a KNOCK—simply that and nothing else.

Robert B. Porter, who was until recently a salesman for the Sherwood Automobile Corporation, Brooklyn, N. Y., is now associated with Finley R. Porter & Company, New York City.

"Voiture de Grand Tourisme"



This Rubay Body Carried on a White "50" Chassis Is the Latest Bus to Occupy the Attention of the Touring Public. It Is Stated That Hotels, Clubs and Transportation Companies Are Much Interested in the Model.

A NEW reflection of the rapid development that is taking place in the motor coach and motor bus field is found in the appearance of a foreign type of de luxe coach, known as "voiture de grand tourisme," meaning a car for extensive touring. This type, which has just been brought out with Rubay coach work on a White model 50 chassis, is a faithful copy of the motor coaches which are operating between Paris and Monte Carlo.

THE design was brought back from France by Leon Rubay, president of the Rubay Company, who found that the voiture de grand tourisme is one of the outstanding achievements of the French coach builders. A chassis designed especially for coach work was needed, not only because of the size, lines and character of the French body, but on account of the higher type of service required of it.

The first of these coaches was dispatched from Cleveland on Sept. 11 on a tour of eastern and coast resorts for the purpose of showing it to a number of hotels, clubs and transportation companies which are interested in de luxe coaches. During the tour it will visit Erie, Buffalo, Rochester, Syracuse, Utica,

Saratoga, Albany, New York, Philadelphia, Atlantic City and many resorts near those points. The striking appearance of the coach attracted crowds wherever it stopped.

In the design and appointment of this vehicle, luxury's limit seems to have been reached. It has an en-

AVERAGE TRUCK DOES WORK OF TWO TEAMS OF HORSES.

THE average truck used in the transportation of farm products to market covers twice the mileage during the day in less time than two teams of horses cover, according to actual test.

Cost figures during the tests show that over a year's period the cost of operating two teams of horsedrawn vehicles was \$1.21 per ton mile, while the operation of the one truck that performed twice the service was only 30 cents per ton mile.

The yearly costs of fixed charges and operation, taken from the books of a large agriculturist, show that the truck's yearly cost was \$2967.62 and the two teams of horses, \$4410.82.

closed drawing room in the rear, accommodating 12 persons, and an open forward section, larger than the largest touring car, accommodating 12 more. Baggage is carried on the roof of the enclosed section for which purpose it is equipped with stairs reaching from the ground to the deck rail. When not in use the stairs are folded up and carried on the baggage deck. In case of storm the open section can be quickly sheltered by a single-bow top and by side curtains which ordinarily are concealed. The Rubay Company is authority for the statement that one French railway operates 175 of these cars in carrying patrons from its termini to resorts as far as 40 kilometers away. Five of them leave Paris every day during the Monte Carlo season, carrying their passengers over 800 miles. The popularity of this type abroad has extended even to Algiers, where a great many of them are in use.

Nothing which could add to the comfort or convenience of passengers has been omitted from the car. The drawing room section is richly upholstered in expensive velour, the seats being extremely deep and soft. The mahogany abounds in appointments which will be appreciated by motor travelers who seek comfort as a first consideration.

Trucks Aid Peach Growers

TO SPEND a day in the peach country is to be amazed at the proportions of the business, the efficiency displayed in handling a crop which is admittedly a hazardous undertaking—once peaches begin to ripen they do it suddenly and in unison, and delay in picking and marketing would be fatal—and the facilities which the grower has commanded and harnessed to his needs.

Two hundred and fifty acres of peaches, a total yield that will exceed 40,000 bushels—is the contribution of one Irondequoit orchardist to this year's bumper crop, a crop that breaks all records for peaches in Western New York. Never before in the memory of the oldest inhabitant has there been such a yield as this year, in quality or quantity. Nor has the demand ever been greater.

IN SPITE of the railroad strike the crop is finding its way to market as fast as it can be harvested—by the efficient motor truck—and thus far the demand has more than kept pace with the supply.

Peaches are cheaper than they have been in several seasons, but the tremendous yield and the ready market are making it a profitable season nevertheless.

Every day a fleet of empty motor trucks, varying in size from the half ton kind to the five and 10-ton monsters, wends its way to the various peach farms in Irondequoit, and before night fall the last has departed, creaking under a load of ripe fruit, varying from 175 to 600 baskets, according to the size of the truck.

Some of these caravans have destinations as far east as Utica, Schenectady and Albany, and others go over the Pennsylvania border. But the great majority seek nearby markets, disposing of the peaches basket by basket directly from the truck and the moving on to the next town in case a part of the load remains unsold.

North from Rochester to the lake is the center of the great peach belt extending along the shoe of Lake Ontario from Niagara Falls to Sodus Point. Here the finest peaches in the world are grown. The towns of Greece, Irondequoit and Webster are among the heaviest producers in the entire peach country.

Five principal varieties are grown in this vicinity. These are the Crawfords, Elbertas and Rochesters among the yellow peaches, and the Carmens and Greenshoros among the whites.

Elbertas are in the lead, both as to popularity and yield, and stand

handling and shipping better than the rest. The week just past saw the finish of the harvest of Rochesters and Carmens, and this week marks the start of the picking of Crawfords and Elbertas.

On the peach farms men and women are employed in the picking sorting and packing of peaches. There are two main packing stations, one on Summerville boulevard and another on Cooper road. Men do the picking and women the sorting and packing.

W. C. Rudman of Cooper road, the largest grower in the territory, has approximately 26,000 peach trees on his six farms. His oldest tree has stood for 30 years and still is bearing heavily.

The exceptionally heavy crop this season, far from being welcomed by the growers, has wrought grave damage to the trees, many of which will be useless after the crop is harvested. In many orchards as high as 25 per cent. of the trees have been broken down to the ground by the load of fruit on their limbs, a fact which has caused the owners no little concern.

It is not uncommon to walk through one of the Rudman orchards and count big limbs broken off on every third or fourth tree, and every little way a big tree split into two or three parts right down to the base of the trunk, the whole tree lying sprawled on the ground.

In such cases there is nothing to do but pull the tree out of the ground and set out another in its place. To the outsider it seems almost a calamity to find so many trees, eight to 12 years old and in the prime of their growth, laid low. But to Mr. Rudman and other experienced

growers, it is all a part of the business—an unavoidable condition of which they must make the best.

Peaches this year are bringing from \$1 to \$1.25 a bushel at the orchard, whereas the growers sold them last year at not less than \$3 a bushel in most instances.

Recently Mr. Rudman shipped 3500 baskets of peaches in 10 hours, and the demand was so great that he was forced to turn away eight or ten trucks to seek their loads from other growers. Mr. Rudman's Rochester market is concentrated in one place—the city's largest department store, which he has supplied for the last 15 years with peaches. During a sale of peaches this store disposed of more than 3500 baskets in one day.

Speaking of transportation, Mr. Rudman said:

"The motor truck has proved a life-saver to the peach crop. For the last three or four years we have been shipping more and more by truck, both long and short hauls, and the crop would have been an almost total loss this year if it hadn't been for this means of transportation.

"The market was never better than now, but the railroad strike would have seriously interfered with marketing this season. As it is, I haven't shipped one car load this year.

"People have learned to make greater use of peaches in the last few years and canning has increased greatly. With the coming into its own of the motor truck as a means of delivering the fruit direct to the consumer, many new markets were opened in the small towns and cities which could not be reached before."

Railroad Interests Deliberately Seek to Discredit Truck

Propaganda Distributed Throughout Leading Cities Called Misleading and Insidious Attempt to Prejudice Public Against Commercial Vehicle.

(Special Letter to Motor Truck.)

WASHINGTON, D. C., Sept. 8.—What is regarded as a deliberate misrepresentation of facts to the reading public and what certainly is insidious propaganda of the most rabid sort is now being circulated apparently by certain railroad interests, although there is no positive information as to the source of these misleading articles.

One piece of literature reads, "PROBLEM IN ECONOMIC—SHIP BY TRACTION AND SAVE THE HIGHWAYS;" if a heavy truck earns 50 cents per mile and damages the highways \$1 per mile and the shipper of freight saves nothing and the truck owner keeps the 50 and the TAXPAYER PAYS THE DOLLAR, WHERE DOES THE TAXPAYER GET OFF?"

"There is work for the automotive industry to do in combatting this propaganda," states a well informed executive and it emphatically is to be hoped that such a movement will start in the near future.

C. S. Mott, vice president of General Motors, because of increasing evidences of a well defined movement that would lay the damage to highways fully to the motor truck, has come to its support in a statement which effectively proves that the contrary is the case. "In some states," says Mr. Mott, "the propaganda against trucks goes to such lengths that its misstatements are bound to react against it."

"Whoever is responsible for the figures quoted (in the foregoing) needs to inform himself more carefully. Trucks do not damage highways to the extent of \$1 per mile. If they did the Wayne county roads would be damaged to the extent of \$450,000,000 per year by only 5000 trucks operating 300 days in the year over 300 miles of road. There are fully that many trucks traveling over our roads, and the Wayne County Road Commission reports that surface maintenance, the need for which results from vehicular traffic of all kinds, and not trucks alone, is about \$200 per mile per year, or \$60,000 for the county.

"Modern practise in road making keeps well abreast of the demands made on the roads by increasing volume and tonnage of vehicular traffic. Marked advances in highway construction have been made in the last five years, which have also seen distinct advance in the automobile truck. The modern roadway is well planned and constructed to resist the effects of traffic. Moreover, the cost of maintenance, taken the country over, is gratifyingly small.

"If all of the anti-truck propaganda is

as inaccurate as its estimates on highway damage by trucks, it will not get very far. It should be said, moreover, that the shipper and the truck owner are not the only ones to benefit by highway transportation; the ultimate consumer, who in the aggregate makes up the general public, benefits, too. And, incidentally, the truck owner, shipper and consumer are all taxpayers and bearing a share of the investment in good roads.

"Rapid vehicular traffic is admittedly hard on road surfaces, and heavy loads are hard on any but the very best highways. There is an economic limit to the advisability of spending money on highways of the best type, based upon volume of traffic and other conditions, but not all the roads of the country have yet been brought to such a state that this economic limit is a very imminent factor.

"The future of highway construction and use will probably parallel the experiences of railroads and trolley lines. Neither the roadbed nor the rails of an earlier day could have borne the Mogul freight locomotives nor the heavy and high powered trolley tractors of today. 'Strap iron' has given way to heavy steel rails. Volume traffic at high speeds has made necessary the creation of our modern roadbeds for railroad and for trolley.

"Volume traffic at speeds undreamed of over the highways of a few years ago has brought about vast improvements in road surfaces, from the standpoints of smoothness, traction and durability."

MACK TRUCKS INCORPORATED SHOWS GAIN.

YORK, PA., Sept. 14.—Mack Trucks, Incorporated, announces that July and

SEVEN CITIES USE 100 MAIL TRUCKS.

SEVEN cities in the United States have equipment in their local postal service of over 100 motor trucks. Chicago leads with 421. The others are New York, 319; Brooklyn (in Greater New York, but having a separate postoffice), 125; Boston, 193; Philadelphia, 193; Washington, 111; St. Louis, 108.

August and thus far September show an increase of 80 per cent. in distribution over a corresponding period of last year. This is conceded to be an unusual condition, especially in the light of poor business which marked the beginning of the summer season for all truck manufacturers.

A statement of the company recently issued shows that earnings for the first six months of 1922 were \$1,570,632, which it is believed will make net earnings for the first eight months especially favorable, the two latter months apparently being close to 50 per cent. in excess of the average for the first six months.

Milton T. Ahlers has accepted a position as engineer for the Columbus Auto Parts Company, Columbus, O. He was formerly assistant chief engineer for the City Machine & Tool Works, Dayton, O.

E. P. Waldon has been appointed production manager of the C. G. Spring Bumper Company, Kalamazoo, Mich. He was formerly assistant superintendent of the Detroit Rolling Mill of the American Car & Foundry Company, Chicago.

At a meeting of the newly organized Associated Motor Industries, Louis Ruthenburg, general superintendent of the Dayton Engineering Laboratories Company, Dayton, was elected president and a member of the board of directors, as well as a member of the finance, advisory and executive committees.

Frank A. Hayes has become associated with the Aeromarine Plane & Motor Company, Keyport, N. J. He was until recently secretary and factory manager of Edward Smith & Company, Long Island City, N. Y.

A. F. Cassel, who was previously general manager for George Cassel, New York City, has become affiliated with the Durant Motors, Long Island City, N. Y.

L. S. Cope has become associated with the National Screw & Tack Company, Cleveland. He was formerly metallurgical engineer for Dannemora Steels, Inc., New York City.

O. E. Byron has become associated with the Shuler Axle Company, Louisville, Ky. He was formerly vice president of the Byron Engineering Works, also of Louisville.

L. J. Butzow has left the service of the Ironton Engine Company, Ironton, O., where he was chief draftsman. He has not announced his plans for the future.

F. J. Sullivan has severed his connection with the Oshkosh Motor Truck Manufacturing Company, Oshkosh, where he was chief engineer and designer. His plans for the future have not been announced as yet.

Major C. C. Benedict, previously at McCook Field, Dayton, O., is now assistant military attache for aviation at the American embassy, London, England.

Edmund Alden Whiting, who was superintending constructor of aircraft in the Navy Department and stationed at Buffalo, was released from active duty on June 30. He has not announced his plans for the future.

Russell W. Cory has joined the engineering department of the Traffic Motor Truck Corporation, St. Louis. He was previously connected with the Studebaker Automobile Company, South Bend, Ind.

Cars and Trucks Built in August Exceed July Totals

Export Conditions Improve—Settlement of Strikes Aids Sales and Industry Believed to Be Facing Unusually Good Fall and Winter Business.

NEW YORK, Sept. 12.—Heavy production of trucks and cars during August, according to reports received from members of the National Automobile Chamber of Commerce.

While the total production for July reached 244,444, estimates based on shipping reports for the first three weeks of August indicate this figure will be exceeded by more than 20,000 machines. Last year August production exceeded July by 445 machines, the figures being 176,340 in July and 180,785 in August, 1921. Thus July, 1922, exceeded the same month a year ago by 38 per cent., while August will apparently increase over August, 1921, by something like 50 per cent. Production of cars and trucks for the entire industry during the first seven months of 1922 reached 1,395,066, compared with 1,668,550 for the entire year of 1921.

The export situation continues to show improvement. Passenger car exports in May exceeded April by eight per cent. and June exceeded May by 15 per cent. The revival of truck business abroad continues to be affected by the disturbed industrial conditions in Europe; exports in May, however, exceeded April by 36 per cent. June exports of trucks decreased seven per cent. under May.

Reports from manufacturing centers are now more hopeful in the matter of coal supply with mines resuming operations and carriers daily recruiting their forces.

The motor car makers and the N. A. C. are carefully watching developments in the railroad strike situation and its effect on rail operations. There has already been some handling of materials overland by truck that would ordinarily travel by rail and the driving of finished cars overland has increased through lack of automobile freight car supply. Motor transport for materials and overland deliveries of finished machines will be undertaken on a large scale should carriers become unable to supply freight cars, it is announced.

P. & R. RAILROAD EXPERIMENTS WITH BUS.

PHILADELPHIA, PA., Sept. 11.—The Philadelphia & Reading Railway recently has started experiments with a motor driven rail bus which may supersede steam trains for passenger traffic to suburban points out of the Reading terminal. This experiment is being watched with interest by several other railroad lines operating in this vicinity and it is believed that indirectly it may result in the adoption of quite a large number of buses.

TRUCKS INCREASE LONG ISLAND FARM INCOMES.

JULIUS OSCHLEIN, Commack, L. I., asserts that a short time ago he was forced to sell his produce at Bay Shore, L. I., a small town near his farm, because he could not reach the New York markets. Again he found, he says, that when his goods reached the market place a large portion of the perishable vegetables had spoiled, due to delays.

He bought a GMC truck and has driven it constantly from his farm on Long Island to New York City markets and found that he could always sell his goods at a much higher price and under the regular city retail figures to thousands of housewives who thronged the public markets.

Mr. Oschlein claims that he was greatly surprised when reaching the market place the first day to find that practically none of the produce had spoiled enroute, where formerly he lost a good portion in traveling a much shorter distance by team.

He reports that many other Long Island farmers are following his example and marketing their goods in the cities where they can sell at much less than retail prices and still make a good profit themselves, over and above what it would bring in the country markets or sold to jobbers.

NEW ENGLAND BUSINESS LOOKS GOOD.

(Special Letter to Motor Truck.)

BOSTON, MASS., Sept. 8.—Motor truck dealers throughout this section of the country state that business in general is very satisfactory and that though August saw a slight slowing up there are especially good indications that fall trade will be entirely satisfactory.

There is considerable building and other construction going forward in this part of Massachusetts, railroad conditions materially have enhanced the use of motor trucks and highways projected last year are being rushed to completion, all of which when taken in connection with the general good business throughout every line of industry presages a good autumn business.

KELLY-SPRINGFIELD HAS RAIL CAR ORDER.

SPRINGFIELD, O., Sept. 11.—General Manager F. H. Pietsch of the Kelly-Springfield Motor Truck Company announces that among the many orders recently received for motor trucks the company has been in receipt of a very satisfactory one which will put several additional motor rail buses in railroad service. This company, always doing a good business, states that orders now on file are especially good considering the season of the year, that business throughout the summer has held fairly well and that future prospects shape up satisfactorily.

WHITE MOVES GENERAL OFFICE TO PLANT.

CLEVELAND, Sept. 9.—The White Company and the White Motor Company have announced that they will remove their general offices from 6611 Euclid avenue to the administration building, at the factory, St. Clair avenue and East 79th street. The local branch of the White company at 407 Rockwell avenue retains its present location.

Maurice Walter, chief engineer of the Walter Motor Truck Company, New York City, has been retained as consulting engineer for the King Motor Car Company, Detroit, in addition to his present duties with the Walter organization.

George Heinisch, formerly mechanical draftsman and checker for the Parish & Bingham Corporation, Cleveland, is now connected with the tank, tractor and trailer division of the Ordnance Department at the Rock Island, Ill., Arsenal.

Otis C. Friend, who was formerly general manager of the Colonial Motor Car Company, Warren, O., is now associated with the R. L. Dollings Company at its Columbus, O., office.

Robert W. Davis has severed his connection with Littman, Bony & Lamprecht, Brooklyn, N. Y., where he was mechanical engineer. His plans for the future have not been announced.

T. A. Henshaw is now engineer for the Wolverine Trailer Equipment Company, Detroit, having been previously purchasing agent for that company.

Rowland J. Goldie has been appointed general manager of the Ruggles Motor Truck Company, Saginaw, Mich. He was previously factory manager for the Columbia Axle Company, Cleveland.

Lawrence V. Smith, who was until recently engineer's assistant in the Public Service Production Company, Newark, N. J., has accepted a position as mechanical engineer with the Chas. McCaul Company, Philadelphia.

E. R. Wiggins, until recently technical editor of the Chilton Tractor Journal, Philadelphia, has become associated with the Holt Manufacturing Company, Peoria, Ill.

Robert M. Warren has joined the engineering staff of the Commercial Engineering Laboratories, Pittsburgh.

Albert W. Frehse has become affiliated with the Reo Motor Car Company, Lansing, Mich.

Minneapolis Sees Good Business Ahead

Motor Truck Paper Hard to Place, But General Conditions Pre-sage Good Sales.

(Special Letter to Motor Truck.)

MINNEAPOLIS, Sept. 11.—The sale of motor trucks throughout Minneapolis and, in fact, the greater part of the State of Minnesota, continues to show the result of returning good business. Many building projects long planned are going forward consequent on a slightly lower market for building materials, certain highway jobs that were in process of construction when the depression came have been revived, all of which when taken in connection with the increased freight business accorded the motor truck due to matters contingent on the railroad strike, makes it safe to assume, say the dealers, that fall and winter business will be much better than it was last year. Motor truck paper is as hard to place as ever it was, few banks being willing to take any large amount. Certain private interests, however, among which are the newly organized acceptance corporations, are taking on dealers in a satisfactory manner with the result that many sales are being made which otherwise could not be obtained.

T. A. AND G. RAILROAD ADOPTS RAIL BUS.

CHATTANOOGA, TENN., Sept. 2.—The Tennessee, Alabama and Georgia railroad started using its first gasoline propelled railroad cars today. This company, one of the first in the South to make use of the motor rail bus, announces that thus far there is every reason to look for the successful operation of these cars and the experiment is being watched with interest by officials of other railroad companies, many of which have announced their intention of securing similar equipment for their short line runs in the event of the new cars performing satisfactorily.

MOTOR TRUCKS MOVE MID-WEST FREIGHT.

MINNEAPOLIS, MINN., Sept. 9.—Many trains have been removed by the Northwestern railroads as a consequence of the shopmen's strike, which in combination with the coal situation, has greatly lowered the freight carrying capacities of these roads. In a great majority of cases the motor truck has filled the gap, however, with exceptionally good results.

Especially it is true with the carrying of mails according to Superintendent E. F. McBride of the local office, who states that mail trucks in operation throughout certain portions of North and South Dakota, as well as northern Minnesota, are

running on regular schedules and routes where railroad service has been curtailed or entirely halted. Bus lines also are making capital of the reduced train service to the various suburban towns and cities of this section of the country and have noted an unusual increase in passengers carried, many of these traction lines being forced to obtain added equipment in order properly to handle the overflow. In many of the routes leading out of Minneapolis half-hour service has given way to the hour service formerly scheduled and it is stated that the number of passengers per trip carried on the half hour schedule exceeds the number carried when the hour schedule was used.

EVERY VEHICLE SHOULD HAVE MIRROR.

WASHINGTON, Sept. 12.—Accidents on the highways could be greatly decreased by passing uniform state laws requiring every truck to carry a mirror, giving a view of the road immediately to the rear, and by requiring every horse-drawn vehicle, as well as automobiles, to display some sort of light when using the roads at night.

This is the opinion of M. O. Eldridge, director of roads of the American Automobile Association Goods Roads Board, after making a careful digest of the traffic laws of all the states of the Union. Mr. Eldridge, in a report to the Secretary of Commerce, sets forth that 13 states have laws requiring the mirror on trucks, but that very few have any regulation for horse-drawn vehicles.

"Motor trucks need mirrors, as they travel at slower rate of speed than passenger cars, and the noise of the engine in many instances completely drowns out the horn of the motorist behind, who is blowing for the road," said Mr. Eldridge. "Often they will swerve about the time the passenger car is about to pass, and this means an accident. As for the light on a horse-drawn vehicle, the need for it is obvious.

MOTOR TRUCK AIDS IN NOVEL PUBLICITY STUNT.

SEATTLE, WASH., Sept. 9.

—A one-room house made from a section of an eight-foot tree is being transported on a motor truck throughout the various cities of the state as part of a carefully planned publicity campaign. *This unique house was carved by skilled workmen from the tree and it is stated that there are no nails or screws used in its construction, the entire building being in one piece with the exception of doors and other fixtures.

A. A. A. Inaugurates Courtesy Campaign

Association Wants Golden Rule Observed by Drivers—Seeks to Lower Accident Toll.

WASHINGTON, Sept. 7.—White stickers bearing the words "Automobile Courtesy" will be issued by several different automobile clubs as part of the courtesy campaign now being carried forward under the auspices of the American Automobile Association, the Chicago Automobile Trade Association and the National Automobile Dealers' Association.

These stickers, attractively printed in green and white, will be issued to motor truck and automobile owners throughout the entire country and many of them already have been forwarded according to a report received in this office.

Dal H. Lewis, acting executive chairman A. A. A. in a recent communication to the press stated that perhaps 50 per cent. of the automobile accidents could be avoided through the use of a little courtesy and in the opinion of those who have had occasion to look in the matter carefully his contentions are accepted as being entirely probable.

The American Automobile Association states that the Golden Rule, "Do Unto Others as Ye Would That They Should Do Unto You," is the fundamental principle on which the courtesy campaign is based. Incidentally, even in the days when so many different projects are occupying the attention of the press unusual publicity has been given to the movement and it is thought probable that much good has been done.

Invitations to 50 representatives from each of seven groups concerned in highway safety are bringing a deluge of suggestions for incorporation in a national safety campaign, planned to retard the accident and death toll of the country due to traffic mishaps, according to announcement by the Highway Education Board.

Almost without exception, replies indicate an eagerness for such a campaign, stressing the timeliness and need for a national movement of this nature. Groups requested to offer suggestions include pupils, teachers, superintendents of schools, automobile clubs, chambers of commerce, police officials and automobile dealer associations.

Outstanding suggestions received to date, it is said, include a national essay contest among all pupils doing class work in the fifth to eighth grades, a national safety lesson contest among teachers, the observance of "Seven Days for Safety," and the distribution of "Pledges of Carefulness" among pedestrians and drivers alike. Oct. 8 to 14 seems the date most favorably agreed upon for the observance of "Seven Days for Safety," according to the general tone of the letters received from many interested persons.

Mayor Hylan Asks for City Bus Line

Makes Third Request of Legislature for Authority to Run Municipal Bus System.

NEW YORK, Sept. 8.—Mayor Hylan for the third time has asked the New York Legislature to give him proper authority to establish a city owned bus line which he feels would save a great deal of coal at the present time when this fuel is somewhat scarce and also would give the city adequate means of passenger transportation. Mr. Hylan for years has been an advocate of municipal buses and several times has experimented with privately owned vehicles, the results strengthening his belief in the great convenience that such a system would be to the city.

RHUE SAVINGS CIRCLE FINDS PROSPECTS GOOD.

MARION, IND., Sept. 9.—John A. Rhue, treasurer of the Indiana Truck Corporation, has just returned from an extended trip.

Mr. Rhue remarked that he was very much impressed with the way business is improving. "Everything is on the up grade. A good fall and winter business is anticipated," he states.

FREE BUS SERVICE FOR WHALEY SHOPPERS.

WHALEY, ALA., Sept. 5.—Merchants and business men of the local board of trade with great success have begun the practise of running the motor buses from the small mining towns and farming communities for the purpose of increasing trade. This town though a part of Birmingham proper, has a population of 20,000, and the Merchants' Association, which is backing the movement, has 85 members, each one of whom at a recent meeting announced that his business had been increased through the adoption of the motor bus idea. There is a belief that eventually the free motor bus line will be extended even further, though at the present time it cannot be stated conclusively that such will be the case. No especial make of bus is used, and as yet no definite plans have been made along this line, several different kinds of machines furnishing the transportation at the present time.

GAR WOOD MEETS DEFEAT AFTER FIVE-YEAR WIN.

DETROIT, MICH., Sept. 6.—Gar Wood, well known throughout the automotive industry, who for five consecutive years has won the Gold Challenge Cup with his motor boats, was beaten at the annual Labor Day race by Colonel Jesse G. Vincent, vice president of the Packard Motor Car Company, who piloted his Pack-

ard engined Christcraft boat to victory. Incidentally, it is assumed that Colonel Vincent's boat could have traveled very much faster than the 39.8 miles per hour recorded, due to the fact that half of the cylinders in the Packard craft had to be dismantled in order to make the boat eligible for the race and it is stated that the boat has been driven miles against time in the very good speed of 42.2 miles per hour.

Edsel Ford, driving his new motor boat, the Woodfish, did 53 miles per hour in the 17th lap of the big race, but was not eligible for the Gold Challenge Cup due to the fact that he had not competed in the qualifying events.

AKRON OWNERS FORM BOOSTERS' ASSOCIATION.

Akron, O., Sept. 2.—Akron motor truck owners and operators have combined with the Chamber of Commerce to form the Akron Vehicle Owners' Association, which body will endeavor to further good roads legislation and also will use its influence to foster truck transportation.

F. M. Opitz, president and general manager of the Perflex Radiator Company, Racine, Wis., from its early inception, has resigned, and now holds similar offices with the newly organized Opitz Manufacturing Company, Milwaukee, which plans to manufacture an improved form of radiator.

O. R. Wikander is no longer consulting engineer for SKF Industries, Inc., New York City. He has not announced his future plans as yet.

Wallace T. Miller has been appointed special representative of the Equitable Life Assurance Society of United States with offices at Baltimore.

Charles M. White, Jr., formerly sales manager of the Frestone Steel Products Company, Akron, O., is now president of White & Company, also of Akron.

"THE HIGHWAY CITY," CHILLECOTHE, MO.

AMONG the many interesting replies received by the National Automobile Chamber of Commerce to a card questionnaire on motor camp sites in the United States, is one from Chillicothe, Mo. This city with a population of 12,560 has no less than 28 national, interstate and state highways passing through it. 23,520 tourists' cars carrying over 100,000 persons visited or passed through Chillicothe in 1921, purchasing merchandise and supplies amounting to over \$241,000.

Issues Million Dollars Worth of Stock

Autocar Company Offers \$1,000,000 Eight Per Cent. Cumulative Preferred at \$102.

ARDMORE, PA., Sept. 7.—The Autocar Company has issued \$1,000,000 of eight per cent. cumulative preferred stock, which is placed for subscription at \$102 a share, certificates to be issued some time during the middle of September. Interest bearing receipts of a temporary character which carry six per cent. yearly until Sept. 15, 1922, will be issued.

OHIO ORDERS ROAD MARKERS FOR DRIVERS.

COLUMBUS, O., Sept. 12.—The State Highway Department has ordered a thousand signs which principally will be placed at cross roads serving to direct the driver to his destination. A blue background on which are white letters make these signs show up well and they should go far to solve one of the problems attendant on car and truck operation.

S. L. Bradley has severed his connection as sales engineer with the Ross Gear & Tool Company, Lafayette, Ind. His plans for the future have not been announced.

Edward A. Dato has been appointed general manager of the Engineering Consulting & Service Company, Chicago. He was formerly experimental laboratory engineer for the International Harvester Company, also of Chicago.

Walter N. Deisher has been appointed manager of the Capital Motors of Ottawa, Ltd., Ottawa, Ont., Canada. He was formerly manager and part owner of the Reo Ottawa Sales, also of Ottawa.

Henry G. Stoddard, vice president and general manager of the Wyman-Gordon Company, Worcester, Mass., has been made a director of the Associated Motor Industries, a new consolidation of producers of automobile trucks and parts.

Charles H. Landsittel has been appointed purchasing manager for the Fox Motor Car Company, Philadelphia, Pa. He was formerly connected with the Haynes Automobile Company, Kokomo, Ind., and the Templar Motors Corporation, Cleveland, in a similar capacity, and more recently was sales manager for the Outlook Company, which is also located at Cleveland.

S. S. Jenkins, who was previously general sales manager with the Bijur Motor Appliance Company, Hoboken, N. J., has become associated with Dodge Brothers, Detroit.

J. R. Van Dyke, who was previously mechanical engineer in charge of the returned goods department in the research laboratory of SKF Industries, Inc., Philadelphia, has accepted a position with the U. S. Ball Bearing Manufacturing Company, Chicago.

Possibility That Mayor Thompson's Chicago Bus Plan May Fail

Strong Interests Favoring Subway for City Oppose Chief Executive's Idea of Establishing Bus System for Which He Requested \$3,000,000.

(Special Letter to Motor Truck.)

CHICAGO, Sept. 9.—The recent street car strike which lasted for a week has shown the people of this city that they are not wholly dependent on street car lines for transportation. Mayor Thompson, it will be remembered, immediately following the strike asked the city council for \$3,000,000 with which to build and equip a fleet of motor buses which would be owned by the city.

It looked for a while as though he would be successful in his quest say those who are in touch with the city affairs and there is reason to believe that eventually he would have found a way to bring his project to the attention of those who would aid in getting it put through.

At the present time the chances for success of the plan are not good because of certain interests who prefer a subway system to that of motor buses. These latter have now come forward with a project that if adopted would mean more street cars for Chicago and in all probability for several years effectively would side track Mayor Thompson's plan. One of the greatest facts apparent in Mayor Thompson's fight for a municipality owned motor bus lies in the fact that Chicago always has been overcrowded and in all probability will continue to grow, thus should not be dependent on fixed transportation methods such as street cars would be.

Motor buses, flexible and easily handled, seem ideal to handle this problem and to cope with it in a way satisfactory to all because of their flexibility. As the city grows and demands greater transportation facilities more buses may be added from time to time without the expense of laying tracks, widening corners, or going to an undue expense consequent on maintenance of what is universally agreed to be a very expensive system.

ELECTRIC TRUCK PARADE TO FEATURE SHOW.

NEW YORK, Sept. 12.—With trucks entered by every electric dealer in the Metropolitan territory, and with more than 20 different users promising to participate, the success of the electric vehicle parade scheduled for Electrical Show Week in October is assured. It is expected that more than 100 vehicles will be in line. The parade will show the great variety of uses to which the electric is put in New York and will demonstrate how the further use of motor transportation will reduce traffic congestion on crowded streets.

Among the entries so far received are those of department stores, bottling companies, rubber goods dealers, a brewer, a wholesale grocer, a produce merchant, a hospital, express companies, storage warehouses, the utility companies, a carpet cleaning company, a paper manufacturer, a canning company, an ice delivery company, an office equipment company, a silk manufacturer and a wholesale baker. The vehicles will range all the way from 750-pound delivery wagons to big trucks of three and five tons capacity.

The parade will be held on Tuesday, Oct. 10. The route has not yet been decided upon, but this detail will be settled with the issuing of the permit by the police department. Arrangements are in charge of Charles R. Skinner, Jr., manager of the Automobile Bureau of the New York Edison Company, to whom entries may be sent.

CLETRAC WILL START ON TRUCK PRODUCTION.

CLEVELAND, Sept. 12.—It is now understood that the Cleveland Tractor Com-

1113 AUTO THIEVES CONVICTED UNDER DYER ANTI-THEFT LAW.

THAT the Dyer Anti-Theft Automobile Law is working effectively is evidenced by the fact that 2120 stolen automobiles have been recovered, and that 2773 arrests have been made, out of which 1113 persons were convicted, with an average sentence of about two years per person.

The main point in the law is that the transportation of stolen motor vehicles from one state to another is an act coming under Federal jurisdiction and hence punishable in Federal courts. The law has been in effect since October, 1920. The good work has been done by the Bureau of Investigations, U. S. Department of Justice.

pany, manufacturer of the Cletrac, will not manufacture the Zeder passenger car, but immediately will go into production on a new light truck, October having been set for the initial appearance of this new vehicle. It is stated that the company was induced to go into the manufacture of commercial vehicles because of a strong belief in very good business during the coming winter and spring. It is understood that the highly efficient engine used in the Cletrac originally was designed so that it could be adaptable for use in a truck and will be standard equipment for the newer product, thus making it necessary merely to increase the capacity of the engine plant—instead of going to great expense in changing over the various equipment as would be necessary if an entirely new engine were to be built. Thus far no name has been decided on for this truck the company states.

PROVIDENCE INSTALLS REPUBLIC BUSES.

PROVIDENCE, Sept. 12.—The United Electric Railways Company has placed an order with the Republic Truck Sales Corporation for six 25-passenger single-deck Republic buses, equipped with the famous Knight sleeve valve motor as an adjunct to their rail system.

These buses were ordered after a thorough test over their lines of a "sample" Republic Knight motored bus, installed at their request by R. M. Sparks, manager of the public utilities division of the Republic Truck Sales Corporation.

The buses that they have purchased are similar to the 27 recently installed in regular service in Baltimore, Md., by the United Railways and Electric Company of that city.

The satisfactory performance of their Republic buses and the close cooperation given by the Republic factory in helping solve their local problems, gives promise that Republic standardization will result in Providence, as is being rapidly approached by a large number of other equally prominent eastern traction companies.

R. W. Dunster, until recently a draftsman for the Boeing Airplane Company, Georgetown, Seattle, Wash., has accepted a position with the Timken-Detroit Axle Company, Detroit.

L. O. Haskins, who was previously vice president and general manager of the Powrlok Company, Cleveland, has been elected president of the Water Baby Company, Detroit.

G. A. Green, who was formerly general manager and engineer of the Fifth Avenue Coach Company, New York City, has been appointed vice president and general manager. The offices of the company have been moved from 10 East 102nd street to 605 West 132nd street.

Announcement is made that H. B. Garman has been appointed works engineer for all the Steel Products Company plants, including the main plant in Cleveland and the subsidiaries. He was previously general manager of the company's Detroit plant.

Better Knowledge of Vehicle Laws Urged

Automobile Association Seeks Legislation to Create Responsible Motor Department.

ALBANY, N. Y., Sept. 9.—Licensing of every operator of an automobile and legislation to create a separate motor vehicle department of the state will be among the important topics at the 19th annual convention of the New York State Automobile Association at Geneva, Oct. 10 and 11.

"The urgent necessity of a centralized responsible department to make regulations and enforce motor vehicle laws is emphasized in the present deplorable conditions prevailing throughout the state; conditions which directly have resulted in 1110 lives being ruthlessly sacrificed and the destruction of hundreds of thousands of dollars worth of property during the present year," said Herbert W. Baker, secretary of the state automobile association recently.

"Glaring headlights are more general than ever, cars with one headlight or glaring lights, or worse spotlight, or no tail lights, are seen in every section of the state every night. Few drivers are familiar with the rules of the road and pay little or no attention to ordinary safety precautions."

MASTER TRUCKS SUED FOR SMALL CLAIMS.

CHICAGO, Sept. 12.—Master Trucks, Incorporated, has been made the defendant in a bankruptcy suit instituted at the request of Maremont Manufacturing Company, Up-to-Date Machine Company and the Auto Body Company, all of this city. It is stated by the attorney for the petitioners that the truck company made a preferred payment to the Vacuum Oil Company of bills totaling \$500 about a month ago. The total amount of the claims is small.

WHITE ADDS NIGHT GANG TO SPEED PRODUCTION.

CLEVELAND, O., Sept. 11.—More than 200 men have been added to the various departments of the White Motor Company to work as a night force, this being the first time in several months that White has gone into a 24-hour day schedule. The demand for the various types of White trucks and buses has made this increased working force necessary, states a communication from that company.

NEW MACHINE DETECTS CARBON MONOXIDE.

WILMINGTON, DEL., Sept. 9.—A new machine for the detection of carbon monoxide gas at low concentration has been developed by Guy B. Taylor, chem-

ist of the Du Pont Company, and H. S. Taylor, associate professor of chemistry at Princeton University. This is a gas which has proved fatal to scores of motorists who have attempted repairs to their cars in their private garages in the winter time, when the doors have been shut.

Announcement of the new apparatus was made at the recent meeting in Pittsburgh of the American Chemical Society. The machine can be used not only for the determination of carbon monoxide or dioxide, but is applicable to other gases and other concentrations when suitably modified. Carbon monoxide is a deadly gas, being present in large quantities in the exhaust of automobiles using the present day fuel.

It is particularly dangerous because it cannot be detected by sight, taste or smell. It is also frequently found in coal mines and may be present in the flue gases from burning coal in power plants, or in any sort of coal burning furnace. Fatal cases have occurred in private houses though only rarely has this happened.

The new machine, it is said, not only detects, but records continuously the presence of carbon monoxide. In principle it consists of mixing continuously measured volume of gas and a liquor reagent and measuring the resulting electrolytic conductivity change of the solution. Its novelty lies in the method of securing accurate control of the volume of the two liquids mixed.

William L. Colt has been elected president of the Colt-Stewart Company, New York City. He was division manager for Willys-Overland, Inc., also of New York City, until recently.

Ellery Irving Garfield is now associated with Louis Renault, Billancourt, Seine, France, as engineer. He was until recently mechanical engineer for C. H. Wills & Co., Marysville, O.

Donald A. Hall has resigned his position as aeronautical engineer on aerodynamic and structural design in the aircraft department of G. Elias & Bro., Buffalo. No announcement has been made as yet of his future plans.

Herbert Von Thaden is now associated with the Aircraft Development Corporation, Detroit.

Chemical Engineers to Meet in New York

Representatives of Trades from All Parts of World to Attend Annual Convention.

NEW YORK, Sept. 13.—The importance of the chemical engineer in the auto industry will be emphasized when 25,000 chemists from all parts of the world will assemble at the Chemical Exposition in Grand Central Palace, in this city.

"In the last six years the gasoline used in the United States per automobile has decreased from 600 gallons per year, to approximately 400 gallons per year, owing, not to a decrease to mileage per car, but to an increased efficiency of carburetors and engines," said Dr. McKee.

"Were it not for this increased efficiency we should already have reached our limit of gasoline consumption and with it probably a price of at least 40 cents a gallon."

MIDWEST TRUCK BUSINESS LINES UP GOOD.

INDIANAPOLIS, Sept. 9.—The annual State Fair which closed today had a record attendance throughout the several days that it ran. In the motor vehicle exhibit there were more than 82 makes of cars and motor trucks on display, all of which were examined by the very large crowd of fair goers.

The recent assurances that all crops easily will be moved to market combines with the high price which farmers are practically assured of to make the fall and winter truck market throughout this section of the country an unusually active one say dealers who have been interviewed on this subject. As a matter of fact business throughout this section has shown an added stimulus consequent on the fact that crop prices are going to be good, which has been added to by the present belief that railroad facilities will be available to move the entire crop to market, all of which has caused a feeling of optimism among motor truck dealers.

D. L. Gallup has resigned, as consulting engineer for the Nordyke & Marmon Company, Indianapolis, and is engaged in consulting mechanical engineering work in that city on his own account. He will specialize in investigation and advisory work and reports pertaining to the design, manufacture, testing and performance of automotive devices and the materials entering into their construction.

John A. Howlett has severed his connection with the Dashiell Motor Company, Chicago, where he was manager of the field service department. His plans for the future have not been announced as yet.

H. L. Dunbar will represent the Motor Master Corporation in Chicago.

FARMERS FAVOR MOTOR TRUCKS.

NINETY per cent. of the farmers who responded to a survey made by the U. S. Department of Agriculture, state that a factor of time saving on the farm is the greater advantage of trucks over horse drawn vehicles. Even on short hauls the motor truck requires only about half the time needed to make the same trip by wagon.

Pointers on Blowing the Horn

WHEN do you sound your horn? There are three different and distinct classes of motorists on the roads today, each of which seems to think his plan of sounding the horn is the only correct one. The first one to consider, for the sake of putting someone first, is the inexperienced driver who toots his horn whenever there is the slightest excuse for so doing. He blows before coming to a crossing, gives a final blast as he leaves the intersecting street, sounds an individual warning for every chicken in the flock that crosses in front of his machine, blows for each vehicle that approaches regardless of how clear the road may

be and when passing through traffic that is at all congested keeps up a continual din that ruins his battery and the nerves of every one within the radius of a mile. He blows when he starts, blows when he stops and at every other time—apparently under the delusion that sounding the horn a lot is more than half of all there is to proper driving.

The second horn blower that we shall consider is the driver of much experience and little judgment. This man as a rule doesn't blow his horn six times from the time he leaves the garage in the morning until he returns at night.

BLIND crossings, cars ahead, curves, narrow roads and places where the view is partially obstructed mean nothing to him—he goes tearing along, more often at 40 than at 20 miles an hour, regardless of what the consequences may be. It frequently happens that drivers of this kind are speed merchants and it is really quite remarkable that they succeed in getting through the day without numerous accidents. They boast that they "drive on the wheel instead of the brake," and it is probably due to the fact that they are exceedingly skillful that their toll of trouble is not greater.

The third type to consider is the ideal driver; the operator of experience who uses careful judgment at all times and as a consequence has no difficulties of the kind that frequently happen to the second class of driver—neither does he annoy others unduly as does the first mentioned operator. This man, in approaching the crossing or intersecting street sees to it that his car is under control and gives one short blast on the horn, at the same time placing his foot on the brake pedal in case he may be compelled to bring his car to a stop because of another driver coming out of the side street. This man realizes that the pedestrian has a right to be on the road as well as himself and simply by remembering the common rules of courtesy which in this case demand that the horn be blown once at a distance far enough away to give the pedestrian ample time to step to one side of the road, makes this phase of driving as it should be.

If he sees that the person crossing the road has ample time to reach the other side before the car comes up on him he does not blow the horn. Neither does he sound a warning if he is positively sure that the person crossing the street, who may be fairly close, has seen the car coming; otherwise, he gives a warning signal, his foot instinctively going to the brake pedal at the time his hand goes to the horn.

This driver, constantly on to his job in passing through traffic, will perhaps cross an entire city without sounding his horn more than a dozen times, simply because he is not only well instructed in the

operation of his machine, but is courteous as well as careful.

If he happens to be driving in the country and desires to pass another car going in the same direction he sounds his horn once so that the driver ahead, if the road be narrow, may turn to the right to allow ample room for the other to pass. He realizes that the driver ahead is the best judge as to when and where to turn simply because he can see what lies ahead better and knows what obstructions are to be avoided. The driver ahead, if warned in a courteous manner, will immediately turn to the right; if he does not, and it is fair to assume that he heard the signal, courtesy demands that the driver wait a second or so before again signaling his desire to pass.

The careful driver signals just before reaching the top of a hill, especially if the road is narrow and there is any semblance of a curve so that any one approaching from the other side of the hill will know what to do. He blows his horn before coming to a cross road unless there is a view of both roads for a sufficient distance to make sure that a collision is not likely, and always before entering dangerous curves in the road he sounds his horn.

Through long experience, tempered by careful judgment, he has become so thoroughly familiar with watching for others that his driving and signaling in a sense are mechanical, which is, of course, the ideal way in which the car should be operated.

In practically every state the laws are similar with regard to the horn or warning signal; it should be sounded at all cross streets and also to warn passing traffic or the pedestrian, and this law, perfectly sensible in every way, as a rule is conceded to be right by all drivers.

It is easy to overdo it as is shown in the foregoing, to the annoyance of others, and strange though it may seem, many complaints from this nature reach the automobile officers of the various states. The greater number come from house owners living at the corners of intersecting streets, many of whom are kept awake at night by the constant blowing of the raucous voiced electric horns. Another group of complainants is comprised

of people living along the highways outside the city limits, while still a third complain that the unusual noise has in many cases disturbed sick persons in their care.

There are many things that should govern the conduct of the motorist who is desirous of conforming not only to the legal, but the moral laws regulating driving. One of these refers to the speed merchant who goes tearing by without sounding his horn. As a rule the driver who is passed feels that by all rights in the world he should not move from his place on the highway because the other driver refused to blow his horn to announce his coming. This line of argument in a sense may work well, but as a rule its a whole lot more sensible and safer in the long run to let the speed maniac have as much of the road as he wants, regardless of whether he sounds his horn or not. Remember the sad fate of the man who was dead right—it goes like this:

Here lies the body of Oliver Jay
Who died maintaining his right of
way—

He was right, all right as he sped
along;

But he's just as dead as though he'd
been wrong.

Give the road hogs all the territory they want. It seems like a raw deal to be compelled to let them have the whole road at times, but it's much to be preferred to spending the rest of your days under a marble shaft. If the road hog hasn't the sense to take proper cognizance of the law in this respect, it is best to let him go his way even at a slight concession to one's pride because he's bound to land in the clutches of the law sooner or later, just as he probably has several times in the past.

Blow your horn, but be sensible about it, find out when, where and how to sound a warning in a manner that will be productive of good results. Let the other fellow blow his horn too and heed the warning it conveys. Blow enough when you do blow and blow often enough—but don't blow too much; its mighty easy to overdo it.

COMMENT OF THE DAY

"BUY HIGH—CRY ONCE; BUY CHEAP AND CRY OFTEN."

The Vigilance Committee of the Associated Advertising Clubs is warning buyers of solid tires to steer clear of old "dump" tires from France that have been trans-shipped, cut with a pneumatic tool into an imitation of popular makes and are being sold to the trade as new material.—News item.

"WELL," grinned the aged solid tire as he settled comfortably back on a shelf in the storage warehouse whence he had been taken with hundred of others. "It's good to get back to America again. When I sailed away with the A. E. F. to France eight years ago I didn't expect to see these shores again. I thought of course I'd get bumped off and left in a shell hole with the pieces of some good American truck, but for some reason or other all the active service I saw was when I was rolled on to a dump on my arrival over there and again when I was tossed with others into the hold of the good ship Atlas on my way back home."

They didn't use you over there? "I heard as much," laughed a used 30x3½ that was recovering from a stone bruise on a neighboring shelf. "Couldn't fill the bill, eh?"

"No," nodded the solid tire, ruefully. I enlisted for duration of the war, but they found after I got there that I had certain physical disabilities that had not at first been noticed and all I got was the dump. You see," explained the aged tire, "I wasn't guaranteed by my maker—simply turned out with others in a hasty manner to fill a hurry-up war order; 'twas more an accommodation on the part of the manufacturer—a war time measure, I might call it."

The old tire, green with age, its rim a bed of rust, leaned against a more comfortable corner of the shelf and continued with the volubleness of age, "I suppose, now that I'm no good, I'll be melted up and made over into a rubber boot or something where the work isn't so hard; for my part I'm not sorry. But we had a wonderful time on the old dump except the rain and snow and general bad weather. That was awfully bad for us. A few months of it would have taken the life out of us—instead of that we had years of it and there isn't one of us that's the least bit of good. They sold us for the price of junk you know—something like a cent a pound I believe. I'm glad I haven't got to go to work at my age anyway."

The smaller tire laughed. "If you think you aren't going to work you've got another guess

coming old timer," he chuckled irreverently. "You don't get to see any such soft job as being a rubber boot yet. They're going to take you over to another part of the building where they keep a set of automatic tread cutting tools and when you come from there you'll be a non-skid tire with an up-to-date pattern that was invented while you were across in the dump pile. Then they're going to pound a few inches of that rust off your rim and paint it black and your own father wouldn't recognize you. When you leave here you'll go to some dealer's shelf as a cut-price tire and they'll put you in a 'Great Clearance Sale' of new tires. Some fellow with poor judgment and a skinny pocketbook will buy you and put you on his ash truck and you'll have a chance to go to the dump you like so well several times a day—only you'll come back again each time."

"I'm going to be represented as a new tire?" asked the old solid uneasily. "That's dishonest isn't it? I shan't like that work I know. I simply can't stand it. I'm eight years old and all in. Do you really mean I'll be sold as a new tire?"

"Just what I mean," grinned the other. "I belong to the janitor of this warehouse and he put me up here the other night after giving me an inside patching. I heard him talking with another fellow about a lot of old gypsy tires that was due here from France and what I tell you is the dope—only I guess even the man that bought the lot of you didn't know the poor shape you was in. He said he was stuck; you was no good he said and he'd never pay no dollar a piece again. But as for not liking the work you're coming to, don't let that worry you. You won't stand more than two weeks of it. You'll get your wish to be a rubber boot before long because about the third trip with a load of ashes to the dump and you'll be left there until a little boy comes along and carts you to the junk man in a wheelbarrow—then you'll get a boiling out and probably become a flapper's overshoe."

"They don't have much respect for age over here, do they," grunted the old tire. "By rights I oughta get a pension."

TANGLED TRANSPORTATION.

“THE truck driver who starts from New York to Maine to deliver a load of dry goods has nearly as much trouble as though he was handling wet goods,” said a disgusted truck driver who stopped at this office for information as to Rhode Island traffic laws.

And he had a just grievance.

According to what he told us (and we already knew it), he starts from New York with a load the weight of which is legal in that state; as he passes into Connecticut, he finds busy inspectors who weigh his truck and inform him that he is carrying an overload. Having paid his fine in Connecticut and shipped his excess freight by the railroad, thereby losing his chance of making a profit on the job, he proceeds to Massachusetts, where he is pounced on for having lights that do not conform to the state law. Truly he has a busy life and one not calculated to make him particularly keen for his job.

Is it possible that a progressive country like America can't have certain motor freight transportation rulings that will cover all states? Why can't the Legislature at Washington take a few moments from wasting time on “bonehead bonuses” or similar fruitless effort and work up a set of Federal traffic laws.

Economic and scientific phases of the highway transportation question have been given considerable thought by persons qualified in every way to work out a solution of the problem, but very little constructive work along these lines has been done by the different states and almost nothing by the Federal government. Let's see if we can't rouse some one in authority to the importance of national highway laws.

TIRES HAVE IMPROVED.

RIGHT now for some reason or other we hear a whole lot about the lack of progress in the manufacturing of tires. “Motor vehicles generally have kept pace with the forward movement so apparent during the last several years,” we are told, “but unfortunately automobile tires have not improved at all.”

Nothing could be further from the truth and a little thought will prove the case. Twenty years ago it was considered unusual for the motorist to get 200 miles of service from his tires. They were crude and clumsy looking affairs made of cloth and poorly cured rubber and seldom gave anything like good mileage. Inside of another decade they had improved materially and we

read in an old newspaper report of a six-day auto race that “Paulman (whoever he was) went the entire course on one set of pneumatic tires.”

The general quality of the tires has increased steadily since that time and as long as six or seven years ago we had casings that delivered 15,000 and 20,000 miles of service on the heaviest of touring cars. The last two years have shown a marked improvement in tire building, tires being so well made that it is doubtful if the recently discontinued manufacturers' guarantee has been noticed to any degree by the car or truck operator.

A poor tire nowadays is unusual because the manufacturers are building them right—and if this statement is questioned hunt around and try to purchase a “second” of a popular make—you'll have trouble finding one, where a few years ago they were to be had in plenty. And this isn't because the guarantee has been discontinued as many seem to think; it's because the proportion of poorly constructed tires, thanks to superior shop practise, design and inspection has reached the disappearing point.

Tires are being made better all the time, regardless of what may be said to the contrary; even though they haven't shown quite the degree of improvement so noticeable in the automobiles and trucks on which they are used.

ABOUT TESTING BATTERIES.

THE several representative battery station operators with whom we have talked regarding the agitated charge for testing batteries and adding water have laughed at the idea. They seem to think the movement has no chance of success and state as their opinion that not one battery station in 50 will give the subject serious consideration.

We haven't carefully considered the matter, but it seems to us like pretty small business to charge for a few teaspoonfuls of water that sells at five cents a quart and the moment or so that it takes a boy to test the battery.

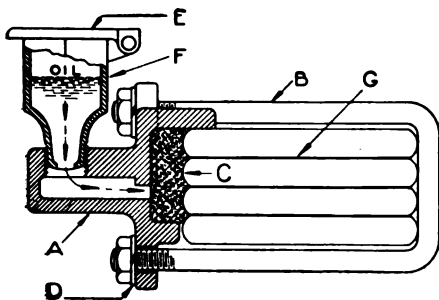
However, we may be prejudiced, due in part to the fact that we have just paid a battery station \$4.85 for “making lamps light”—and then had to take the car to another station and pay 90 cents more actually to make them light after the first “workman” had put them entirely out of commission.

It seems to us that the average battery station gets a fair enough profit without charging for inspection.

Still we may be prejudiced—that's possible.

ACCESSORIES DEPARTMENT

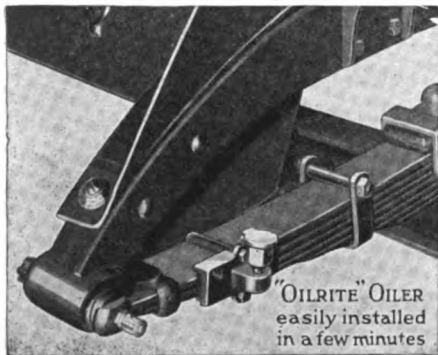
Brownell Oilrite Spring Oilers are very easily attached to the springs of any car by a universal continuous U bolt. They



are designed to be placed on the side of spring near the end, then by inserting bolt and tightening two nuts it is properly secured. Lock washers are used to prevent loosening.

Two oilers required on each spring section. Number for complete set depends on type of spring suspension, as follows:

Complete Set
Ford—All models..... 4 oilers
Semi-elliptic—Front and rear.... 8 oilers



Semi-elliptic—Front and three-quarter elliptic rear..... 10 oilers
Semi-elliptic front—Platform rear 10 oilers
Price per oiler, \$1.00.

Manufactured by Brownell Motor Specialty Manufacturing Company, Dayton, O.

Lubri-Tector is a small, but carefully designed device, it is said, that gives absolute protection against burnt-out bearings and scored cylinders. It also prevents gasoline leakage and the disastrous fires that may result.

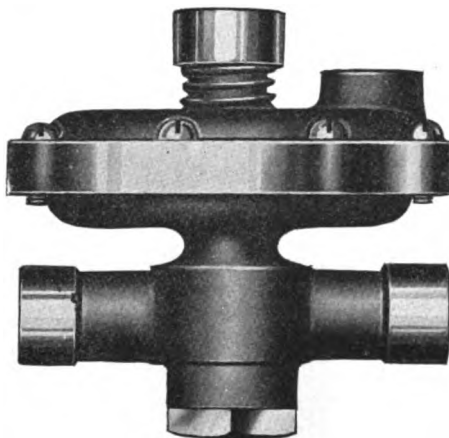
Only a few minutes are required to install the Lubri-Tector on any internal combustion engine with a pressure lubricating system.

The cost is negligible and there is nothing to wear out or need replacement. Its use is said to lengthen the life of the engine and avoid expensive repair bills.

The Lubri-Tector is installed as close to the carburetor as possible. The oil line is cut, a tee inserted and the line from the

tee connected to the opening in the top of the device.

Just as long as the engine is running and the lubricating system functioning properly, the oil pressure exerted against the diaphragm of the Lubri-Tector will keep the valve in the gasoline line wide open.



But let the oil supply run low or the pump fail, the oil pressure ceases and the gasoline valve closes immediately, stopping the engine until the trouble is remedied.

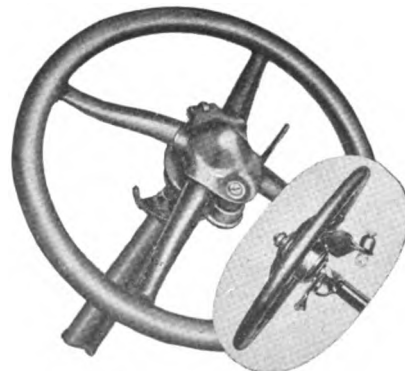
It is far cheaper to prevent damaged bearings and cylinders than to repair them.

And when the engine is voluntarily stopped by the driver the valve in the gasoline line automatically closes until the engine is started again, preventing gasoline leakage.

Manufactured by the Pierce Governor Company, Anderson, Ind.

Motoright Ford Lock is a lock made entirely of tough steel with a glass hard surface. When locked it covers the hub of the steering wheel and grips all four spokes. A glance will tell whether or not it is locked.

It screws on in place of the steering



gear cover and can be installed with a wrench and a hammer in five minutes it is asserted.

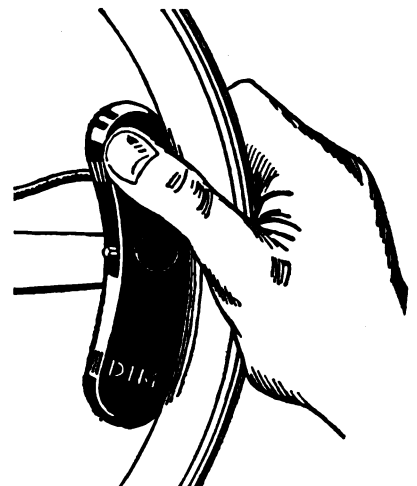
The arrangement of standard Ford parts is not changed and there are no plungers or inside parts that can get out of order or accidentally interfere with the steering, it is claimed. The key slot is above the wheel and in front of the driver, so there is no fumbling around with the key.

Manufactured by the Packard Engineering Company, Cleveland, O.

Roxwitch is a device which puts the headlight and horn control under the thumb without changing the position of the hand on the steering wheel. It fits against the inside rim of the steering wheel. The location is convenient to the driver's thumb and it operates by a simple rocker motion. Press down in front for bright lights. Rock back in opposite direction for dim lights. In neutral position it puts lights out.

Drivers claim it is easier to operate than gas or spark levers and the horn button in the center is operative in all positions.

It is a neat and an extremely attractive device. The case is brass, finished in dull black enamel, baked on. The horn button is red moulded material. All moving parts and contacts are enclosed. No dust



nor rain can reach them. It comes equipped with cable and terminals, all ready to attach.

Full instructions for attaching furnished with each switch.

The installation is said to be easily accomplished there being no holes to drill, joints to solder nor special fittings required. A screw driver and a pair of pliers are the only tools needed.

Manufactured by Patton-MacGuyer Company, Providence, R. I.

(When Writing to Advertisers, Please Mention the MOTOR TRUCK.)

Weaver Universal Tire Changer is a mechanical means perfected for dismounting and remounting all styles of pneumatic automobile tires. It is said the most difficult tires can be changed in a small fraction of the time required by usual methods and the improved service will enable the owner to add a splendid advertisement and attract new customers. Every operation is performed by means of smooth finished rollers and there is no occasion to injure either casing or

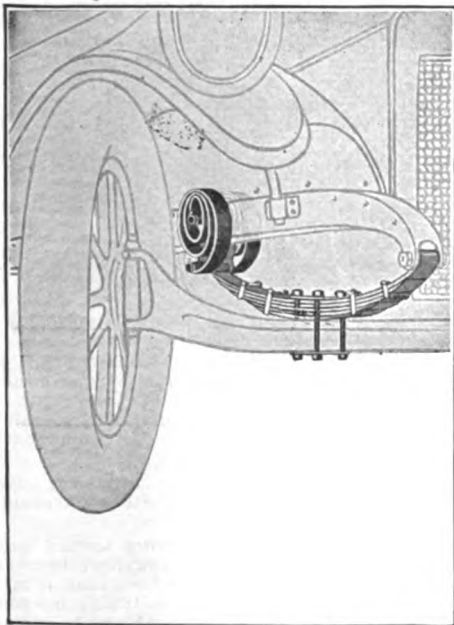


rim, even in the most stubborn cases. When using the tire changer to expand or contract split rims there is not the slightest possibility of springing them, since pressure on the rim is uniformly exerted by means of the three jaws. This permits the rim to retain its natural contour. The danger of springing rims, always present when a jack or other method employing only a two-point contact is used, is eliminated.

The Universal Tire Changer is constructed sufficiently strong to meet all requirements of the service for which it is intended. The various attachments shown in cut for removing tires, including goose neck, are included with the equipment.

Manufactured by the Weaver Manufacturing Company, Springfield, Ill.

Alta Shock Absorbers can be easily and quickly attached by any garage mechanic and cannot get out of order, it is claimed. They are ornamental and add finish to the appearance of the car springs. In



equipping the car no holes are bored and no parts are cut off.

The bodies of nearly all motor cars are suspended by laminated springs, which must be made stiff enough to support the

weight of the car, but which, at the same time, cannot be made long and flexible enough to absorb the shocks on rough roads.

This produces a result often unendurable by those on the rear seat.

Alta Shock Absorbers overcome this difficulty by substituting for the stiff, unyielding shackle one that is elastic and resilient and takes up or absorbs all the vibrations.

The car floats on the Alta coils.

The Altas are snubbers as well as shock absorbers. In addition, the Atlas keeps the wheels constantly in contact with the ground, this preventing a large proportion of wear and adding greatly to the life of the tires.

Manufactured by the Alta Company, 417 Market Street, San Francisco, Cal.

Greaserite Pressure Greasing System has been designed to fill a long felt want by the trade, for a portable pump or device for dispensing greases accurately by measure, with the least possible effort, and at the same time eliminating waste and leakage, also the trouble of worn or broken parts. The Greaserite tank, with a capacity of 70 pounds of grease, and the automatic double action measuring device, is a departure from the antiquated and messy grease bucket method of dispensing greases.

Practically every garage and service station is equipped with air pressure, so this novel device takes its place in line with the rest of the shop equipment to render a greasing service that is quick,



positive and clean, at the same time delivering the grease to the place where the man who drives a car wants it. This greasing system operates with air pressure and displaces the old troublesome hand-operated grease pump.

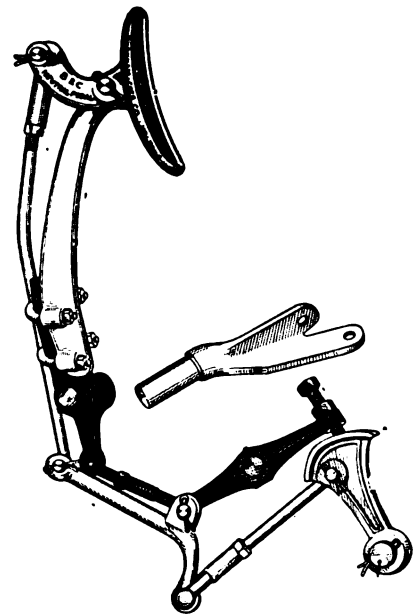
Manufactured by the Greaserite Manufacturing Company, 608 South Dearborn Street, Chicago, Ill.

Burnham-Cote Neutral Pedal is designed to provide a positive neutral position in operating, relieving the driver of all guess work and much uncertainty.

The emergency lever may be left in the old position on the floor of car, or if used regularly to lock car when stopping, it may be arranged to stand in convenient position within easy reach of the hand.

(When Writing to Advertisers, Please Mention the MOTOR TRUCK.)

Operation of car is not changed materially. Naturally when leaving the car the clutch is released and pedal is left in neutral position. This is impossible with

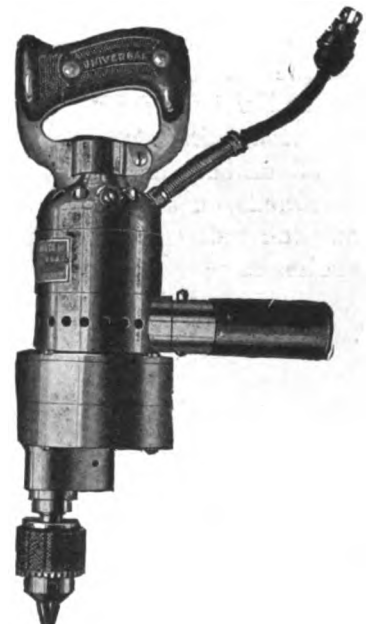


regular Ford pedal without resorting to the use of the emergency brake lever.

In starting, press forward at any angle to engage low, and when rolling release into high by raising the heel a trifle.

Manufactured by Burnham-Cote Company, Holyoke, Mass.

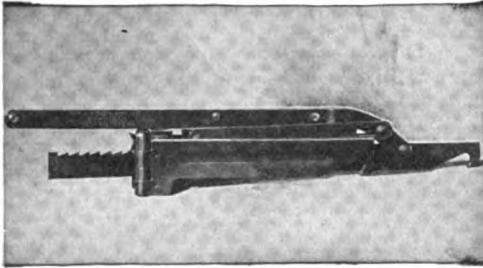
Arnold Type "B" Drill has been successfully developed in response to the demand for a light weight tool that will give maximum service under most severe use, it is stated. Mechanics throughout the country have found it to be a drill that affords real pleasure to use, for it is said to eliminate the unwieldy features in tools of this kind.



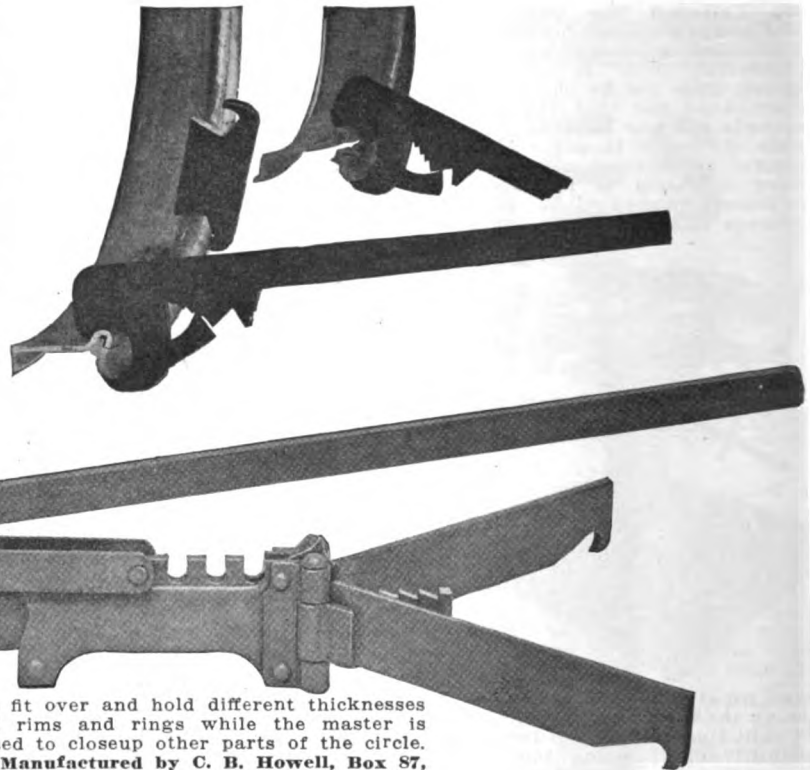
The offset spindle permits of close-corner work. Handles are removable and the switch within easy reach. The housing is aluminum throughout.

This drill is particularly adapted for automobile and garage work and the type recommended for use with a reciprocating valve grinder, although its uses in other directions are unlimited in shops both large and small.

Manufactured by Arnold Electric Tool Company, New London, Conn.



Howell "Ring Master" is designed for shrinking and locking the side ring, forming the outer flange of solid rims and wire wheels. A large percentage of these rings are twisted and sprung when pulled out to change tires and to get them back is very difficult.



No ring can resist the grip of "The Ring Master," it is said, and with it the replacing is easy.

The set consists of the master tool and two double ender holding clamps, gauged

to fit over and hold different thicknesses of rims and rings while the master is used to closeup other parts of the circle.

Manufactured by C. B. Howell, Box 87, Cleveland, O.

Davis Reseating and Boring Tool does the work for which it was designed in a most efficient way it is said.

One feature is the perfect work it will do in renewing or enlarging the ports, making the actual surface of the valve seat narrower, as after continued grinding and facing of seats they become too wide, allowing carbon to be deposited on the large surface, while the narrower valve seat will expel the carbon and will keep in shape longer and be easier to grind.

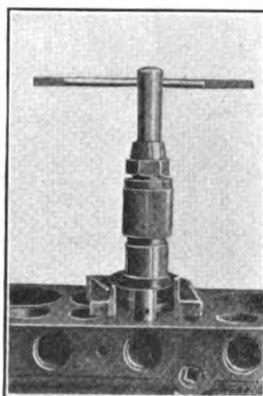
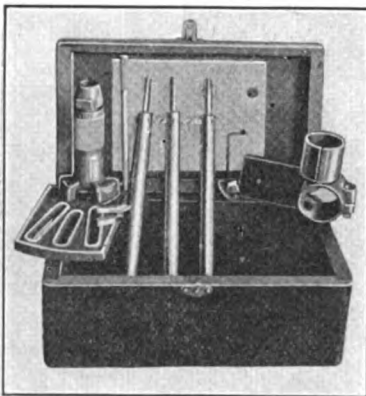
This tool will rebore the valve ports larger so a larger size valve may be used it is stated. On many motors this adds

signal when the gasoline reaches the depth for which it is set. It gives warning several times, so there is no chance of failing to hear its signal.

The first alarm is sounded as car rounds a corner, caused by gasoline flowing towards end of tank. When car again takes the straight road the alarm ceases until another turn is made, when the warning signal is again sounded. This will be repeated for five or six times, when the alarm will finally sound its last call on a straight road; still allowing plenty of time to get to a filling station. Placing the bell inside the tank gives a

including six inches.

Pistons can be checked for diameter,



to the power and speed very materially, as it gives quicker inlet and outlet to the cylinder charge.

The cutters are regular lathe tools, made of best high speed steel that will last for years and any shop man can resharpen and keep them in shape. Provision is made also for pilots centering in worn guide holes.

It has an attachment whereby Bulck valve cages can be handled perfectly it is stated.

Manufactured by the Hinckley Machine Works, Hinckley, Ill.

The Huskee Gasolarm is a simple mechanical device that replaces the cap in the gasoline tank and gives a warning

louder signal than if it were on the outside as the tank being almost empty, vibrates and magnifies until there is no chance of failing to hear the signal.

Manufactured by the Huskee Tool Manufacturing Company, Providence, R. I.

Atlas Mikro-Indicator Piston Gauge is an adaptation of dial indicator to a bench gauge for rapidly checking the diameter of pistons, piston pins and other cylindrical articles with diameters up to and

"roundness" and uniformity. Piston pins can be rapidly sized; flat pieces can be gauged for thickness. Variations are instantly shown on the dial; larger dimensions appearing on the steel scale in inches, by sixteenths; smaller dimensions and variations on the dial in thousandths of an inch.

It has many valuable auxiliary uses, being adapted for nearly all work requiring a dial indicator.

It can be used for testing turned work in lathe; for testing crankshaft bearings in a truing fixture, and furnishes a most convenient direct reading inside micrometer by the simple removal of the indicator from the saddle.

Manufactured by George H. Wilkins Company, 180 North Market Street, Chicago, Ill.

(When Writing to Advertisers, Please Mention the MOTOR TRUCK.)

Holden Air Shock Absorber is a cylinder nine inches long with a piston working inside. When installed on a car the shock absorber with the piston at the half way point in the cylinder. When the car strikes a bump and the frame of the car is forced downward by the impact, the air is compressed below the piston and cushions the excessive down thrust, thereby relieving the spring to a great extent.

When the frame or body of the car start back on what is termed "the rebound" the air is compressed above the piston and thus the rebound is checked. A check valve is located at the bottom of the cylinder and it opens and admits air when the piston is on the up stroke.

A similar valve located in the cylinder head opens when the piston goes downward. A small hole is located in the cylinder wall about in the middle of the stroke.

This relieves the pressure on the piston until the piston has passed the center one

tributing the pressure over a larger surface.

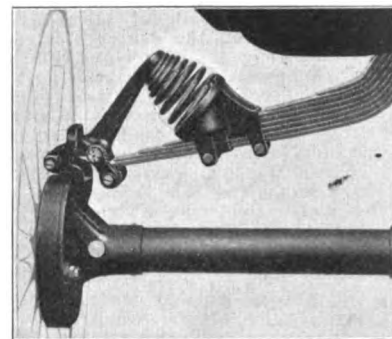
The principle does not stop here, however, for there is still another surface which now comes into play on the cylinder wall—and this distributes the tension over the entire width of ring.

Manufactured by the Krasberg Piston Ring Company, Chicago, Ill.

Stow Flexible Radial Grinder was designed to fill an urgent demand for a tool to do grinding with maximum power over a large area, for the operation of abrasive wheels and wire scratch brushes, for the work on automobile bodies, large castings and similar applications. It is furnished in several sizes, depending upon the maximum size wheel or brush required.

The machine may also be furnished for drilling or with screw driver for assembling. The weight of the flexible shaft is counter balanced so that the operator is free at all times, having the tool within easy reach and control.

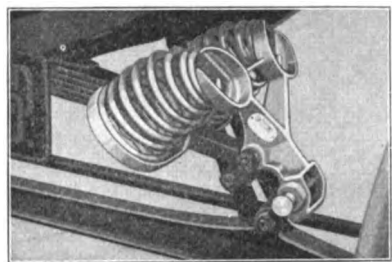
We recommend this tool for all types of



cups for proper lubrication the manufacturer claims.

The springs are made of the finest spring material, carefully heat treated in the Hassler plant and individually tested for resilience and strength.

The springs for the different models are provided with just the right degree of re-



silience to compensate for the different weights of bodies which the car carries.

Manufactured by Robert H. Hassler, Incorporated, 1509 Naomi Street, Indianapolis, Ind.

Butler Vaporizer is a device recently placed on the market which is claimed to greatly reduce fuel consumption and increase engine efficiency. This superheating device is installed between the carburetor and the intake manifold and consists of seven copper tubes, through which the fuel mixtures passes, enclosed in a cast iron heating jacket. The hot gases from the exhaust pipe are bypassed around these tubes and let out by another pipe terminating beneath the motor pan.



The seven small tubes in the Butler Vaporizer eliminate the "cold center," bringing all the liquid fuel into contact with heated surfaces, flashing all the mixture into a dry gas that immediately increases the flexibility and power of the engine, it is stated.

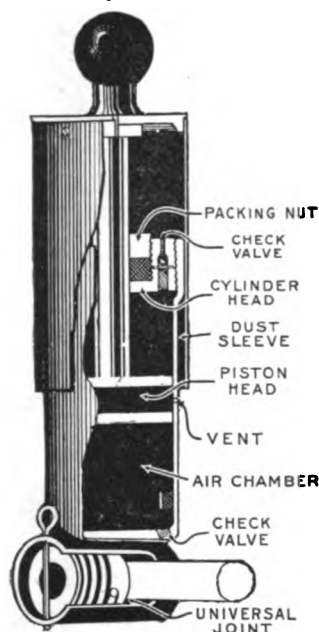
It eliminates carbon deposits and crankcase oil dilution.

It reduces fuel consumption 20 to 40 per cent. as proven in official tests at Yale University and in the Tracey Laboratories.

It also greatly facilitates starting away with a cold engine in cold weather, as the Vaporizer heats up in 30 seconds.

Manufactured by the Butler Vaporizer Corporation, 7 East 42nd Street, New York City.

(When Writing to Advertisers, Please Mention the MOTOR TRUCK.)



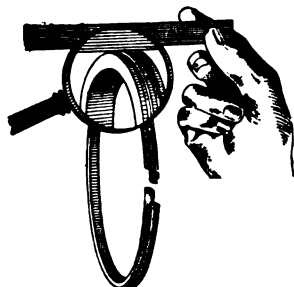
way or the other.

This absorber will not interfere with the normal action of the spring over comparatively smooth roads. The absorbers are made in four different diameters, namely, two inch, 2½ inch, three inch and 3½ inch.

The correct diameter for each particular car has been determined by experiment. The heavier the car the larger the cylinder used.

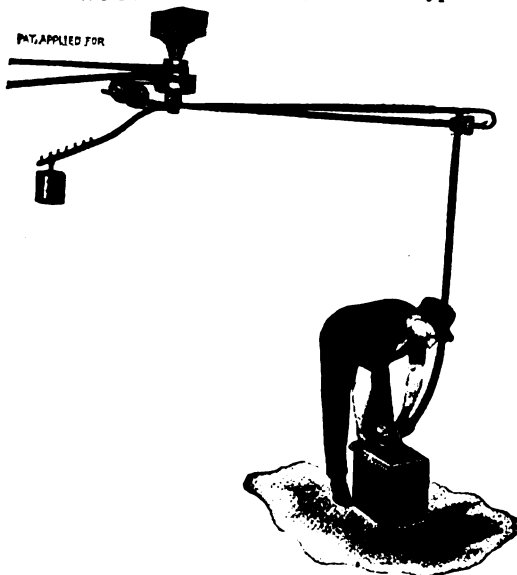
Manufactured by Holden Shock Absorber Company, 3105 San Pablo Avenue, Oakland, Cal.

"Instantaneous" Piston Rings have three raised surfaces, each one and one-half thousandths of an inch above the other. The center surface being the highest takes first pressure on the cylinder wall and under ordinary conditions completely



seats in a run of less than 25 miles.

As the center surface "wears in" the second or upper surface comes into bearing and this also seats quickly, thus dis-

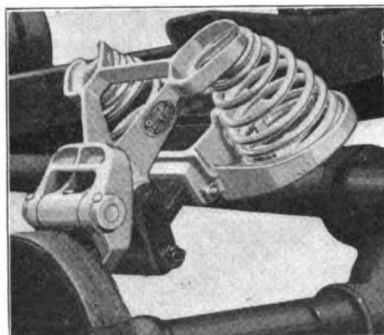


grinding, drilling boring and wire scratch brush work. It takes up no floor room, works in a circle limited only by the extension arm, it is stated.

Manufactured by Stow Manufacturing Company, Incorporated, 443 State Street, Binghamton, N. Y.

Hassler Shock Absorbers are made in a complete line for every model of open and closed Ford cars and for commercial cars and ton trucks it is stated.

The distinctive feature of these absorb-

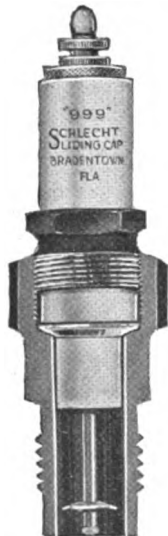


ers is that they combine a quick acting coil spring shock absorber with a most effective rebound check. They not only cushion the bump, but they stop the rebound it is stated.

Hasslers are thoroughly engineered and have been perfected by years of actual experience. They are built according to the best mechanical standards with removable bushings and ample provision of oil

Schlecht Sliding Gap Spark Plug is designed with a nickel alloy steel disc, which slides on the center electrode. At the instant of explosion this disc is thrown upward, striking the bottom end of the porcelain. The disc is the firing point in this new constructed plug.

This disc is so spaced that the proper distance is made between the end of the disc and the shell wall, which forms the spark gap. The disc is mounted loose on the center electrode, which causes an intensifier. Should oil cross from one firing point to another, the following explosion throws the disc upward, striking the



porcelain and breaking the oil bridge.

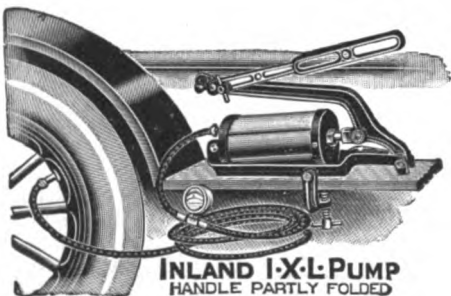
This plug is guaranteed by the manufacturer never to burn out or wear out the disc and same will be replaced free at any time if it proves defective. It is guaranteed to run many times longer in an oil pumping motor than any plug on the market. Retail price, \$1.25 each.

Manufactured by Schlecht Spark Plug Company, Bradentown, Fla.

Inland Lever Pump is designed for operation on the running board of the car. It is said to require but small effort on the operator's part to cause it to function properly. It is equipped with a patented folding handle which may be closed against the cylinder.

The cylinder is made of seamless drawn sheet steel 3x6 1/4 inches. It is said to be absolutely leak-proof with a smooth bore. There is no seam in cylinder to wear out the plunger.

The plunger is made of best grade leather, especially oil treated, which



means permanent service.

All bearings are steel. The frame and handle are of malleable iron and thumb screws are of screw steel.

The hose can easily be detached from pump so that it does not jam when packed in tool box.

The deflator in hose connection opens the tire valve, which enables accurate gauge reading of the tire pressure at all times and makes easier pumping.

Manufactured by Universal Manufacturing & Sales Company, 552 West Harrison Street, Chicago, Ill.

Despatch Universal Electric Oven is designed to meet the requirements of electric service stations, garages and manufacturers. This oven has a temperature range of 100 to 400 degrees Fahrenheit and a maximum current consumption of 900 watts on high heat, 400 watts on medium heat and 200 watts on low heat. Ovens are furnished for all standard voltages and operate on either alternating or direct current.

The three-heat rotary switch control enables the operator to obtain the temperature desired without over or under heating.



It is a commercial oven built to stand the severe uses of the garage, electric service station and factory.

The heating elements consist of the Despatch open wire companion wound units which are the latest improvement in electric heating. They are so constructed as to give even distribution of heat whether switch is on high, medium or low.

This new feature adds to the effectiveness of the drying or baking processes and guarantees even distribution of heat.

Manufactured by the Despatch Manufacturing Company, 116-122 First Avenue North, Minneapolis, Minn.

Ezy-Out Screw Extractor is a tool expressly designed for the quick and easy removal of broken set and cap-screws, studs, stay-bolts and pipe fittings.

Instead of fussing for hours with files and punches or drifts, it is only necessary to drill a hole in the broken screw and



insert the proper size Ezy-Out Screw Extractor—twisting it as though tapping with a left hand tap.

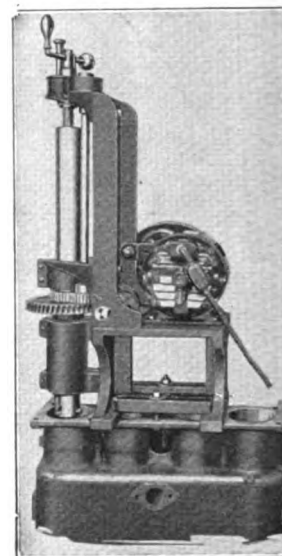
The twist forces the corkscrew-like spirals to grip the sides of the drilled hole and then, as additional force is brought to bear on the tap wrench, the screw begins to come—after which it is an easy matter to spin it out on its own threads just as if it had never broken off at all.

Manufactured by Cleveland Twist Drill Company, Cleveland, O.

Wepplo Reboring Mill is said to meet the demands for a simple, light, portable cylinder reboring machine at a moderate price, within reach of every garage. It has been designed especially for internal reboring on a great variety of motors, where the rapid removal of stock and accuracy of the work are of great importance.

This reboring mill will save time and the expense of removing the block, it is said, as all that is necessary is to take the head off the cylinders and pull out the pistons, or with the solid head type of motor, remove the cylinder block, then center the mill with the self-centering discs and bolt it to the head of the motor or cylinders and proceed with the operation of reboring. It not only rebore, but also polishes. By attaching a polishing head it is possible to get a very highly polished surface. This additional feature is well worth consideration. The finishing of the bore of a gas engine cylinder is the foundation for perfect operation of an engine. Every garage owner should investigate the great difference in reboring, in reaming or in grinding out a cylinder.

The manufacturer states that the reason this reboring mill will rebore the cylin-



ders absolutely true is that the cutting tools do not follow the egg-shaped cylinder wall and there is no wear. This gives a perfect bore with no variation of size in the full length of the cylinder, consequently insurance against any leakage in the cylinders.

It is asserted the machine is so rigid and accurately built that the chattering of the cutting tools is impossible with the worm drive feature. The finishing tool overlaps its cut on each revolution, leaving an excellent finished surface. It is constructed as only the highest class of machines are, using a very heavy feed screw inside the boring bar, which will last and remain true for an indefinite period. The boring bar is made of the very best grade of steel and is 1 15/16 inches in diameter. There are three very heavy take-up bearings which hold the bar absolutely true. There are two cutting tools, so arranged that the lower cutting tool is making the first heavy cut, while the upper cutting tool is producing the fine finishing cut.

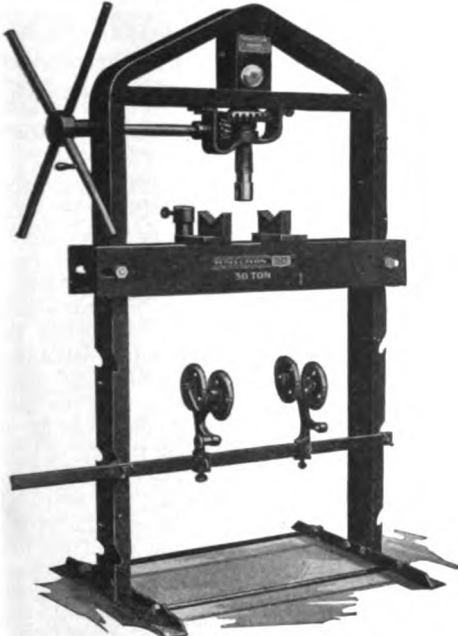
The electric motor is a 1/4 horsepower, furnished for any current desired. The motor is back-gear to run the cutting tool at the rate of 25 revolutions per minute. The mill is equipped with change gears to give the polishing head the speed of 100 revolutions per minute. The handle on the top is to be used for turning up the bar after having finished reboring the cylinder.

Manufactured by the Wepplo Machine & Tool Company, 2340 Montrose Avenue, Chicago, Ill.

(When Writing to Advertisers, Please Mention the MOTOR TRUCK.)

Perfection Multi-Purpose Arbor Press is a machine for a large or small repair shop. It is capable of handling a great variety of work with unexcelled efficiency. The first class jobs it turns out, coupled with its distinctive features of construction, strongly recommend it to the buyer who is looking for a good arbor press, it is said. The cross tie is securely welded to the side frame members in order to obtain the greatest rigidity and strength of construction in this press.

To prevent whatever material is used as an arbor or secondary ram from flying into the face of the operator, should it bend, a small cap has been added to the end of the ram to hold the arbor in place. This is a feature much appreciated by the operator because it insures complete security from danger.



The gears used in this press are all steel. They are geared to a ratio of two to one on the 30-ton press and 3½ to one on the 50-ton press. The ram is made with a two-inch screw, four-pitch Acme thread. It has a nine-inch movement and various positions are quickly obtained by the adjustable table. This press will accommodate any work the repair man is called upon to do, it is claimed.

The hand wheel arms, attached to the shaft driving the pinion gear, are placed at the proper height and are long and strong enough to permit the operator to use his entire weight on a downward pull. When operating the press the mechanic stands in front of the machine where he can watch his work instead of working a ratchet lever off to one side and not being able to see just what the machine is doing.

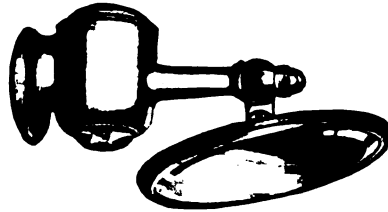
The Perfection Press is equipped with an automatic bell alarm that warns the

mechanic when he is within one inch of the limit of the downward movement of the ram.

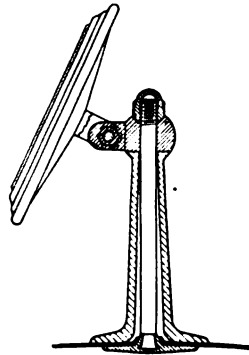
The truing up device consists of a pair of centers, one dead center and the other movable, also a set of four discs machined to run absolutely true. With the aid of this device any average mechanic can produce results in truing up cam shafts, axle shafts, crank shafts, differentials and machine spindles, it is stated. It can also be quickly removed from the machine and placed in a vice for extra large work.

Manufactured by Naperville Machine Company, Naperville, Ill.

Diuguid Fender Mirror has many advantages as the method of attaching requires drilling only one 5/16-inch hole in



the mudguard. The stem is inserted from underneath and a large valve shaped head which is a part of the stem conforms to the shape of the mudguard when tightened by a nickel plated tapered nut on

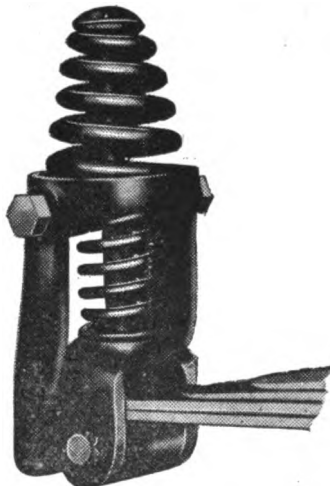


top of base. This makes a very rigid and water tight connection and is also free from vibration.

Manufactured by Diuguid Brothers, 975 Atlantic Avenue, Brooklyn, N. Y.

Shok an' Snub Double Duty Absorber should meet with immediate favor among all Ford owners. It is a three-in-one accessory at moderate cost through which all the advantages obtained by the use of higher priced shock absorbers are obtained.

The pyramid or bee hive designed springs are said to give that gentle, floating, noiseless action characteristic of the air suspended type absorbers usually



found equipped only on the expensive cars.

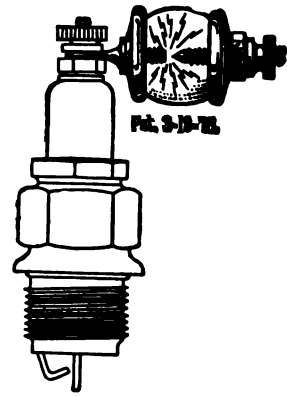
In the capacity of a snub and recoil check it is said the jerky, destructive return action of the car springs, which is the chief cause of the breakage of springs, is gradually absorbed and eliminated.

With the rebound thus effectively controlled the springs will give much longer wear it is stated.

Distributed by the Wisconsin Shock an' Snub Company, 403 Merrill Building, Milwaukee, Wis.

Universal Spark Plug Intensifier is a great aid to motor ignition, and enables one to get satisfactory results from a plug which is worn out, or on which the insulation is broken, it is said. It overcomes spark plug trouble, making a plug that is fouled with grease or carbon, or that has a broken porcelain, fire perfectly, it is claimed.

If the magneto is not working properly a wire short-circuited or broken, or the batteries out of order, you can tell instantly, by raising the hood and watch-



ing the spark in the glass cylinders. If the spark does not show, then the battery or magneto is not delivering the current to the intensifiers.

The intensifier has adjustable terminal points set in a bull's eye cylinder of glass, which magnifies the spark and gives a clear vision from every angle. If the ignition system is weak, simply loosen the hexagon nut on the side which the terminal is fastened to and give the screw a slight turn to partly close up the space between the two points in the glass cylinder.

Manufactured by Universal Manufacturing and Sales Company, 552 West Harrison Street, Chicago, Ill.

Matchless Combination Plier has jaws which readily adjust themselves to grip objects of irregular shape and hold them rigidly—also round, half round, square or hexagonal forms.

A slip joint permits the jaws to open very wide for large nuts and the curved upper jaw gives a pipe wrench grip on pipe or rods from ¾ to 1¼ inches in diameter.

The nose is tapered and beveled at the ends. This allows small parts to be ad-

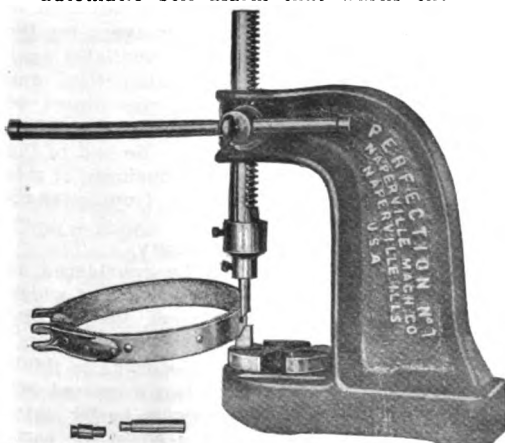


justed, cotter pins pulled in places where an ordinary plier is useless.

A screw driver point is forged on one handle for emergency use. It is also very handy for prying open clamps and battery connections.

A groove in the lower jaw holds wire or small round parts against teeth of upper jaw so a vise-like grip is secured. A practical wire cutter is located between the jaws.

Manufactured by the Bridgeport Hardware Manufacturing Corporation, Bridgeport, Conn.



(When Writing to Advertisers, Please Mention the MOTOR TRUCK.)

Financing Farm Machinery

(By C. S. BRANTINGHAM, President, Emerson-Brantingham Company, Rockford, Ill.)

THE development of the farm machinery industry is so familiar to most people engaged in it that it seems hardly necessary to call attention to the fact that from its infancy this industry has felt compelled, in addition to the usual conduct of its business, to help finance the farmer in connection with his farm machinery purchases, at least over the crop-raising period and in many instances for a longer time. This has been due to lack of adequate banking facilities to meet the farmers' necessities in many of the rural communities. The past few years this condition has changed to some extent; yet the past year has demonstrated that country banks have not been able to or would not help finance the farmers and dealers to the extent that they required. It has been impressed upon farm machinery manufacturers time and again that if they did not cooperate in the matter of extending credits, crop-raising, particularly in the newer western districts, would be greatly retarded. It is the manufacturers' judgment that they have materially aided the development of the country by their credit extensions.

HOWEVER, the sale of automobiles to farmers—reported in most cases to have been made for cash—has seemed to discredit these views to some extent; and we believe that this experience should convince manufacturers that while they may not be able to conduct the farm machinery business on as short terms as the automobile people have been doing, yet they should endeavor to make farm machinery sales on materially shorter terms in the future than in the past, even though in recent years there has been a very material improvement in the direction of shortening terms and lessening farm machinery credits. It is to be hoped that during the next few years the manufacturers will be able to hold the improvement that has already been made and even further shorten the time, particularly in the older settled districts.

Liberal credits to dealers and farmers have of necessity caused farm machinery manufacturers to carry what might otherwise seem to be an excessive amount of notes and accounts receivable, the cause for which has not been easily understood by bankers generally and particularly by those located in larger cities. If we have been wrong in thinking it was necessary to assist the farmers as has been done this is a good time to consider the question and correct it.

The above facts have of necessity contributed to quiet an extent to the discomfort of the past year in this industry. However, it has not been alone in its difficulties, as practically all other industries have been inconvenienced in much the same way. We believe, however, that the acuteness of the situation might have been lessened had more attention been given to the relationship between capital and volume of production and sales at the beginning of each year.

Based on figures compiled from published statements of several manufacturers in this line, whose annual sales aggregate over \$400,000,000, there appears to be no question about the fundamental soundness of this industry; but these same figures show an unbalanced condition in the fall of 1920. It is probable that manufacturers have not fully appreciated the possible effect of slow turnover of capital in times like the present and, therefore, have not realized just

what this has meant during periods of sharp curtailment in volume of sales and general slowing up in collections.

The figures examined indicate that there is now employed in the industry approximately \$1.35 of available capital for each \$1 of sales. This ratio would be increased or decreased by the volume, due to the fixed plant investment. By "available capital" is meant the net amount invested in the industry, including capital stock, surplus and such amount of borrowed money as is carried over from year to year. Statements of some companies show a greater ratio of capital to sales and others a lesser, dependent somewhat on the nature of their business. Doubtless some of this difference is due to the care with which executives have watched placing manufacturing orders and looked after collection; but taken as a whole it appears that this industry should be conducted with a lower ratio of capital to sales than has existed in the past.

Making the Business Desirable from a Banking Standpoint:

There seems to be general agreement that a well established business should be so organized that, while during the peak of the year's business it is advisable to depend upon borrowing considerable sums, it should aim to liquidate all its borrowings by the end of the year, and that a business is regarded as on a thoroughly sound basis when it can liquidate its entire indebtedness at least once each year. Bankers never question the credit of an institution so conducted.

Sometimes it would appear that few bankers appreciate how sound the farm machinery business really is. At the end of 1919 the companies above referred to showed an aggregate ratio of total assets to total payables to be 644 per cent. and current assets to total payables 460 per cent. At the end of 1920 these ratios were still high—

Total assets being 489 per cent.

Current assets being 351 per cent.

The drop being due entirely to increases in inventories and receivables, causing increased payables. These increases were brought about by the sudden cessation of sales.

While some directors and executives may think that there is a benefit to their companies in depending upon deriving a

part of their working capital from what we will call permanent payables, yet this reasoning may properly be questioned when we consider that year in and year out borrowed money costs approximately six per cent., which, taken in consideration with the liberal bank balances required, and interest deducted in advance, makes the net actual cost to the company from eight per cent. to nine per cent. When it requires \$1.35 to \$1.50 of capital for each \$1 of sales, it means that capital derived from permanent borrowings is costing eight to 12 per cent. of the sales made possible by such borrowings. While some years net earnings are in excess of eight per cent., a considerable part of the time it has been proven that there is insufficient margin in the farm machinery business to justify such borrowings. Therefore, considering the risk taken—particularly in times of depression—it would appear that the industry would be better off if it were established and controlled on a basis that enabled each well managed institution to pay off its seasonal borrowings once each year. This would mean, under ordinary conditions, going out of debt 30 to 60 days annually. For the purpose of clearly defining what is meant by "out of debt," a company is generally considered out of debt when its cash on hand is comfortably in excess of its total indebtedness—except bonded or funded indebtedness.

If all executives would plan the conduct of their businesses in advance of the coming year with full regard for the relationship between their available capital and contemplated production and sales programmes, with the object in view of being able to pay all current borrowed money during or at the end of the year, we would make the business of this industry highly desirable from a banking standpoint.

Purpose of This Discussion:

We do not want to be considered as discrediting past methods, most of which have been good and were justified by conditions then existing; but the dislocation caused by the war leads us to think that we may be able to throw around our respective companies even better safeguards than have been used in the past. Each one can check any suggestions made against his own experience and de-

termine for himself whether or not anything has been said that would be helpful. There are some phases of the situation that undoubtedly could be helped if each company in this industry would exercise greater restraint in the conduct of its business, thus avoiding injurious practises that have apparently grown out of each one attempting to furnish all the goods that their sales departments could get orders for, regardless of the burden they were placing on their working capital, resulting in possible over-expansion of their manufacturing plants, production programmes, inventories and carrying excessive receivables.

We have in mind that it is one thing to offer theoretical ideas and figures and quite another to carry them out in actual practise. The suggestions contained herein are, therefore, intended only for the purpose of stimulating thought along the lines discussed. We recognize they are not "cure alls" nor are they adapted to all companies, some of whom doubtless have better ways of controlling their business than herein suggested.

We believe that annual liquidation of payables as suggested can be made possible with very moderate changes in the methods of conducting the business.

We might perhaps better express how this could be accomplished by using an illustration.

Let us assume that a well balanced farm machinery company might be organized—based on ample capital to finance \$800,000 minimum and \$1,000,000 maximum annual sales and pay off all seasonal borrowings once each year.

Such a company would require \$1,200,000 fully paid up capital stock, either common or preferred, together with the usual seasonal borrowings. This capitalization would allow \$1.50 capital per \$1 sales on \$800,000 minimum sales volume. This ratio of capital to sales would be

DISTRIBUTION OF INVESTED CAPITAL.

Assets: CB

	Amount.....	Per Cent. of Available Capital.....	Per Cent. of \$800,000 Sales.....	Comparison with the Experience of Several Companies*
Plant....	\$420,000	35	52.5	41.2
Inventory	400,000	33 1/3	50	65.4
Receivables	240,000	20	30	32.1
Cash.....	140,000	11 2/3	17.5	6.0
	\$1,200,000	100	150	144.7
Less Reserves.....				9.7

135%

Liabilities:

Capital Stock.....	\$1,200,000
Payables—at beginning and end of year	None
Surplus	As accumulated
Reserves	As accumulated

*Note—In the right hand column is shown the actual average experience taken from statements compiled as of the close of the year 1920.

proportionately reduced if sales were increased \$1,000,000. We use the amounts named merely as convenient units. Anyone desiring to make comparisons with their own figures may do so by multiplying the distributions used of invested capital by the amount of their own sales. The percentages shown should apply to any farm machinery business unless its conditions are unusual. These percentages will change to some extent with the fluctuations in volume of sales of each company. A company so organized would properly distribute its investments as shown in table.

The above figures show that the plant investment percentage used on \$800,000 sales is approximately the same as average actual experience.

The inventory percentage used is lower than the average actual experience at the end of 1920, and also lower than 1919; but we think all will admit that inventories at the end of 1920 were excessively high, and we believe that with greater care, 1919 could be improved. Inventory figures are intended to cover all kinds of inventoried items.

The receivable percentage used is somewhat lower than the average actual experience in 1920, but higher than 1919; but out of the companies under review, three companies conducted their 1920 business so that the receivables at the end of the year were, on an average, practically the same as the percentage used, while one company shows materially less. This company, by the way, in 1912 or 1913, had over 100 per cent. of its year's sales in receivables on hand at the end of the year, while its statement at the end of 1920 showed that it had only 16 1/2 per cent. receivables on hand at the end of the year, showing what has been accomplished through persistent efforts. Receivable figures cover all class of receivables.

The cash-on-hand percentages and amount are shown to be higher than general experience in 1920, but not as high as 1919. This was used for the reason that it serves to offset any fluctuations in inventory and receivables, which fluctuations are sure to occur, due to various causes. Another reason for providing a liberal cash balance is that if \$1,000,000 maximum sales are to be financed, the peak of the year's payables (which will probably occur approximately May 1st) will be in the neighborhood of \$500,000. Banks in loaning money expect commensurate balances carried on deposit at all times of maximum lines of credit. This, therefore, broadly establishes the average cash on deposit at \$100,000. Some companies do not observe these rules, and operate their businesses by carrying materially less deposits; but such violations doubtless affect their credit to some extent.

If a company is organized with less capital than outlined above, and expects to sell from \$800,000 to \$1,000,000 annually, it must depend upon permanent payables or be able to conduct its business average experience to be. In the event a company depends upon permanent payables as a part of its working capital, it can hardly consider that it is on thoroughly sound financial ground, particularly in times of business disturbance

like the present. However, to whatever extent the asset investment percentages in inventories and receivables on hand can be reduced below those shown, the capital requirement can be correspondingly reduced.

The object in analyzing a business carefully in advance of making plans for the coming year is to avoid its getting out of balance during the year through organizing for a larger volume than can be safely financed under all conditions. If we are not mistaken, few people engaged in business have been willing to fix in advance a maximum sales programme, feeling that if they can sell the goods they will find some way to finance. This method, however, leads too many companies into excessive expansion of plants and placing excess orders for materials, providing for excess sales organizations and arranging to employ too much labor, resulting in excess inventories, excess sales costs and frequently financial distress.

Therefore, as the business is now conducted, it is suggested that with \$1,200,000 capital, it is not safe nor is it good business for a farm machinery manufacturing company to plan on maximum sales in excess of \$1,000,000; while on the other hand, a company employing \$1,200,000 capital cannot satisfactorily earn on its capital if its sales are materially less than \$800,000. This ratio of available capital to sales would apply equally to a larger or a smaller volume than \$1,000,000 annual sales.

Conducting a Business:

There are two distinct methods of conducting a business. The effect on the net earnings, as we will show later, is decidedly different. We will refer to them as

The "MAXIMUM PLAN" and

The "MINIMUM PLAN."

The term "Maximum" is used to indicate the highest safe volume and liquidate payables at the end of the year.

The term "Minimum" indicates the lowest volume that will safely carry necessary overheads and general expense items.

The maximum plan contemplates establishing the production and sales organization on the basis of maximum volume of sales possible, which apparently has been common practise, especially in 1920 and 1921; and, in the event the maximum sales are not attained, then the net profits are less than expectations, while if sales are materially in excess of the maximum, then the finances of the company are strained to the extent of the excess demand for capital unless unusual collection methods and collections are made possible.

The minimum plan is to organize on the basis of the minimum volume of sales on which a moderately satisfactory profit can be made on the capital employed and enable the company to very easily pay off all its debts once each year. Such an organization will produce exceptionally good results should the sales reach the maximum amount, without very greatly increasing general sales or other expenses. With a minimum organization the danger of exceeding the established maximum is not very great,

provided the maximum is fixed at about 25 to 33 1/3 per cent. above the minimum.

Under the minimum plan, careful consideration must be given to watching the progress of orders written, and should orders show decidedly more than necessary for the minimum volume, promptly make provision in the production end of the business to take care of the increased volume, but not plan in excess of the maximum set at the beginning of the year without first making ample financial arrangements to cover the excess.

Utilizing Elasticity in Organization:

The minimum plan is based on the belief that there are few salesmen who cannot increase their sales 25 per cent. in favorable years over normal experience, and that there are few branch houses that cannot handle an increase of 25 per cent. with their storage and clerical organizations should the business be available. Very seldom are any of us, either in the production or sales ends of our business, working much more than 75 to 80 per cent. of our possible capacity, which we believe is generally regarded as reasonably good. In other words, the minimum plan makes full provision for taking advantage of the elasticity in the organization, particularly in the sales and production departments, while the maximum plan takes no advantage of this elasticity, thus making an almost certain large loss in earnings if the business does not come up to the maximum amount of sales.

If, therefore, we plan for \$800,000 minimum sales and employ the proper number of salesmen (based on normal sales experience per man) place manufacturing orders for that volume in a normal way and the season develops favorably and we feel certain of getting more than the minimum—even up to the maximum—we should be able to take care of the increased volume through the natural expansion of our organization and thereby get an abnormally good year. While on the other hand, if the situation were reversed, we would get a rather poor year if organized on a \$1,000,000 maximum plan basis provided the sales dropped to \$800,000 or thereabouts.

To illustrate, we will show the workings of the minimum plan on exhibit "B-1"—The maximum plan on exhibit "C-1."

Exhibit "B-1"—

Minimum Plan of Organization.

If organized on a \$800,000 minimum sales basis the year's operations would be somewhat as follows:

	Dollars	Per Cent. Expended
Total cost of operations, including—		
Cost of production.....		
Sales expense.....		
General and other expenses (including taxes)	89.75	\$718,000
Interest paid.....		
Net profit.....	10.25	82,000

Should sales exceed expectations and reach \$1,000,000 (cared for in part by reduction of inventory and in part by increased production), the showing would

be approximately as follows:

Net profit on \$1,000,000 sales as shown above (before taking into account savings as outlined below).....	10.25%	\$102,500
Plus increased earnings due to larger volume..		

On account of:
Amount saved by having greater production over which to distribute overheads 4.00%

Having a larger sales volume over which to distribute sales expense 3.00%

Total saving.... 7.00%

Deduct possible increase in interest charges incident to increased volume. .90

Net saving.... 6.10% 6.10% 61,000

Total net profit on \$1,000,000 @ 16.35% \$163,500

Note: On an increased volume of sales no saving is estimated on "General and Other Expenses," but allowance is made for these to increase in the same ratio on the \$1,000,000 volume as obtained on the \$800,000 minimum.

Exhibit "C-1"—

Maximum Plan of Organization.

If organized on a \$1,000,000 maximum sales basis the year's operations would be somewhat as follows:

	Dollars	Per Cent. Expended
Cost of production.....		
Sales expense, general and other expenses (including taxes).....	86.65	\$866,500
Interest paid.....		
Net profit.....	13.35	133,500

Should sales for any reason reach only \$800,000, the showing would be as follows:

Net profit on \$1,000,000 sales as shown above.....	13.35%	\$133,500
Less decreased earnings due entirely to lessened sales—		

On account of:
Reduction factory operations increasing cost of production through having to carry full overhead on decreased volume 4.00%

Having to carry a maximum sales expense that could not be reduced in time to make material savings 3.75%

General expense

and other expenses that could not be decreased (including taxes) would add in percentage not less than 2.50%

Total decrease in earning percentage 10.25%
Deduct possible saving in interest, which saving is doubtful .90

Total increased cost of carrying on the business on a minimum sales volume of \$800,000 9.35%

Leaving net profit 4.00%
On \$800,000 @ 4% \$32,000

Net loss in earnings due to decreased volume when maintaining full maximum organization \$101,500

It is well to note that decreased plant operations merely reduce the money expenditure in materials and labor, which saving is provided for in the 9/10% allowance for "saving in interest." Overheads, such as general expense, sales department and factory supervision, foremen, clerks, taxes, depreciation, etc., cannot be reduced very much during the year.

Control of a business can be materially aided by the use of budget control charts somewhat like the ones shown herewith. Charts are very helpful in visualizing figures.

Exceeding the Maximum:

While it is always gratifying to have sales show a larger volume than anticipated, yet excessive volume brings more complications than many manufacturers realize. The extreme production strain, in many instances, is very wasteful. This is due to the excess demand generally coming at times when other lines of business are also active, making it very difficult to obtain adequate materials and experienced labor, which, if not obtained in time to finish goods for seasonal requirements, causes the goods or the materials to be carried over until another season, thereby increasing the capital requirement and absorbing a considerable part of the anticipated profit. This perhaps was never better illustrated than in the year 1920. Every manufacturer that we know of in the farm machinery business was told by his sales department that they were losing immense quantities of orders in 1920 and that increased provision must be made for 1921 to take care of the business that up until Nov. 1st appeared to be in sight for the year 1921.

We think we are safe in saying that if any one of the larger companies could have accepted all of the business that was offered to it in 1920, they would have taken care of the entire shortage of goods that was apparent at that time. In other words, if a dealer wanted 50 plows

and could not get them in time from his regular source of supply, he would try a half dozen or more manufacturers in an endeavor to get that one lot of plows. If six manufacturers to whom he applied could not take care of his order, each one would feel that they had lost the sale of 50 plows. Had they all recorded their shortages and added them together, it would have shown a shortage of six times 50 plows, or 300 plows, whereas the actual shortage was only 50 plows. If all companies should have expanded their production capacity to take care of the amount of business that they thought they had lost, it is plainly apparent that there would be provided an aggregate increased capacity for six times as many machines as were really short, resulting in over-expansion of production and consequent absorption of working capital.

The above is assuming that each one had no maximum limit on the amount of business that he would undertake for 1921 if his sales department thought they could get the orders. This is where a minimum and maximum control plan in the conduct of a manufacturing business, as described heretofore, would prevent any manufacturer operating in a way that would permit excessive expansion through undertaking to accept and provide for sales that his available capital would not justify, thus insuring against wasteful over-expansion of plant facilities, sales organization and general organization, as well as protecting the company against becoming a burden on its banker and thereby contribute towards the general financial stringency.

We, therefore, believe that from a financial standpoint, it is dangerous for a farm machinery organization to build buildings, expand equipment, order materials and take on labor without contemplating the possibility and impossibility of financing a greater volume than a safe maximum.

In the sales end of the business, in our opinion, it is also equally dangerous to increase the number of branch houses, salesmen and sales effort in excess of a safe maximum, as failure to ship goods on time for seasonal requirements only increases sales expense percentages and other complications.

Standardization and Elimination:

In straining for unlimited volume of sales, implement companies' executives listen too readily to the plea for new kinds and varieties of machines, generally because some competitor makes and sells them, thus the line becomes over-expanded, production costs go up, inventories increase, branch houses are not large enough, and salesmen are overloaded with a long list of machines to sell until too many of them do not know thoroughly all the machines they are selling. Nothing is more important in the control of a business than standardization of product and elimination of undesirable and unprofitable machines.

If a business is organized on a minimum plan basis it will almost wholly avoid severe fluctuations in its production and sales organizations. The minimum plan insures steadier production in its factories; it avoids trying to add too many kinds of new machines that inevitably increases costs of production and

divides sales effort; it avoids excess purchases of materials and excess employment of labor; it almost insures constant plant operations, normal stocks of raw materials, work in progress and finished goods. What is true in the production end is equally true in the sales end as affecting steadiness of organization, employment of branch managers, salesmen and clerical forces. It must be more dependable than the results ordinarily attained under the maximum plan.

In General:

In discussing this question we are well aware that our country would not be what it is today were it not for the ambition of its manufacturers and business men in the direction of constantly increasing volume of sales and consequent earnings. Many a remarkable success has come out of businesses that during some part of their development were over-expanded; but we think we are safe in saying that for every outstanding success that has grown out of such a policy, there have been a vast number of failures—the successes being due more to the accurate judgment of the management than to the over-expansion policy employed. Those who have been constantly carrying a greater load than they were financially able to do, have suffered from meager earnings and indifferent progress; but had they more nearly confined themselves to a sound volume and let their growth be in proportion to their accumulated surplus through net earnings (always keeping their finances comfortable and sound), they would, in the end, in our judgment, have been vastly better off.

Executives' Relief from Constant Worry:

There is an asset value not often given any consideration in having executives relieved from unnecessary worry and in too many cases loss of health while trying to manage and finance a business that is constantly out of balance, due to trying to build and sell more goods than its capital will safely justify.

A company, as well as an individual, is more nearly wealthy, in the broad sense of the word, when its debts are safely under control at all times, and it is not straining the business beyond safe bounds. It is our observation that in the long run businesses so conducted make and accumulate more net profit than those who do otherwise. It is true that we can all recall exceptions to this rule; but where there is one exception we find a dozen or more that would have benefited by conducting their business somewhat along the lines suggested above.

The Implement Business in Recent Years:

We think we are safe in saying that if the implement industry as a whole had been working during 1919, 1920 and 1921 on a minimum and maximum plan basis, or its equivalent, all companies engaged in the business would be much better off today, and some of the casualties that have occurred would have been avoided: implement plants would not have been closed to the extent that they have during 1921; employees would not have suffered from lack of employment; losses on inventories would have been greatly reduced; the strain on bank credits and on executives would have been greatly lessened. In fact, this year, this indus-

try would have suffered as little as any. Some such policy as outlined above would have prevented many manufacturers from preparing to build the quantities of goods that they undertook during 1920 for 1921, anticipating a tremendous business this year. None would have bought the quantities of materials that they did in 1920, nor would they have expanded their fixed plant investments at peak cost prices as was done in some instances.

Taken altogether, we cannot but feel that some kind of a self-control plan or system fixing approximate minimum and maximum sales volume to be undertaken, based on available capital and payables to be liquidated once each year, would be a marked step in advance. Let the policy of each company be just as aggressive and progressive as its executives are capable of carrying on, but not let the maximum limits be exceeded without abundant arrangements for capital in advance, always having in mind that all current payables shall be liquidated at least once each year. It is our belief that no situation can arise that will greatly disturb a business conducted on such a basis and that in the long run it must, with reasonably intelligent and aggressive management, be much more profitable than the average business has been in the past.

There is probably nothing that has bothered executives more during the year 1921 than lack of working capital; consequently, the longer sales and collections continue on a low level, the greater will be the problem of working capital. Many manufacturers throughout the country have been seeking to increase their working capital through stock issues, debentures and other financial devices. Too many of them are seeking more capital instead of better management to carry them through this period of industrial uncertainty. The management who seeks to have its financial problems solved only by seeking new capital in the future is likely to be disappointed.

Let each one of us quit the policy of carrying burdensome inventories, over-extension of credit and consequent excessive borrowings, which policy ignores the future welfare of the business, destroys morale and breaks down the company that tries to adopt it.

Rules for Sound Readjustment.

The following might be considered a basis for sound readjustment for any manufacturer:

Reduction of overhead without disrupting organization.

Thorough knowledge of current production and selling costs at all times.

Make purchases of materials to meet readjustment of inventories, and only cover actual requirements for balanced production.

Conduct sales and production to liquidate inventories.

Reduce operating costs, especially the cost of handling work between operations at machines.

The important result will be:

Lower costs and better service for all concerned.

Smaller inventories.

Quicker turn-over and

Less need for new working capital.

State Regulation of Motor Vehicle

(By HARRY MEIXELL, Secretary Motor Vehicle Conference Committee.)

MOTOR vehicles are subjected to two general but distinct uses: First, they are privately employed by their owners for the transportation of persons or property; second for the transportation for hire of persons or property of others than their owners.

The second general use is sub-divided into two definite and particular uses. In the first place, motor

vehicles operating for hire are employed to carry certain persons or the property of certain persons to places prescribed in individual agreements entered into for the purpose; in the second place they are employed to carry indiscriminately all persons or the property of all persons under general conditions of agreement applicable to the whole public.

IN A word, the second general use of motor vehicles, i. e., for hire, splits into that of private carriers and common carriers.

Until a few years ago the legislatures of our 48 states in no way differentiated between these various uses of the motor vehicle in the laws which they enacted dealing with operating requirements, registration fees and the many other subjects which are usually found in a state's motor vehicle laws.

In 1914, however, Pennsylvania definitely segregated motor vehicles when used as common carriers and placed them under the regulation of the State's Public Service Commission. Today the laws of 22 states provide for a greater or less degree of such state control.

On the following pages is a tabulation setting forth a digest of the more important matters which through the year 1921 had been made the subject of those state laws specifically enacted to bring motor vehicle common carriers under state control and regulation. This tabulation should be carefully considered in connection with the following discussion of the data which it contains.

State Agency Exercising Control.

Without exception state regulation of motor vehicle common carriers has been vested by law in pre-existing state agencies that exercise control over other forms of common carriers such as railroads, trolleys, telephone and telegraph lines, pipe lines, etc. The third column of tabulation on page 4 shows that these agencies have consisted of State Public Utilities or Public Service Commissions, Railroad Commissions, the Commerce Commission as in the case of Illinois, the State Tax Commission of Alabama, the Arizona Corporation Commission or even the State Road Commission as in West Virginia.

In some instances these pre-existing state agencies have assumed control over motor vehicle common carriers by virtue of the broad general powers of the laws establishing the Commissions. The Railroad Commission of Georgia, for instance, maintains "that operators of motor vehicles, holding themselves out as carriers of passengers or freight, either or both, for hire, and operating over established routes, are subject to the jurisdiction of this Commission. This Commission has not, however, had occasion up to this time to exercise this jurisdiction." In certain other instances, however, where the laws have been specific-

ally limited in their application where their application to motor vehicle common carriers has been a matter of doubt, attempts on the part of the state agencies to extend their power over highway transportation have usually ended in the courts and in decisions adverse to the contemplated expansion of control.

Application of Control.

In its broadest conception a motor vehicle common carrier is one that passes any and everywhere over the highways indiscriminately, transporting for a consideration all person who present themselves as passengers or carrying all commodities or classes of commodities offered. Obviously this involves interstate transportation. The Federal Interstate Commerce act takes no specific cognizance of the matter, however, so the application of control by the various states is in no way guided or modified by Federal laws on the subject.

A few states deal with the subject merely from the standpoint of local control, the incorporated municipalities being given power by the state legislature to require motor vehicle common carriers to obtain permission and a license for operating from the local governing body. This is the case in Massachusetts where the Board of Selectmen or City Council exercise control over motor vehicle common carriers transporting passengers.

As for state control this expresses itself in two ways: On the one hand there is a state law whose provisions give to some state agency broad general powers of control over motor vehicle common carriers. On the other hand, for the execution of these powers, the agency is permitted to promulgate and enforce such rules and regulations as it may deem necessary, express stipulation being made in some of the state laws on the subject, that these rules and regulations shall take precedence over municipal ordinances.

The various laws establishing and defining this state control have in many cases, however, greatly narrowed its application. For instance, while most of the states which have dealt with the subject allow their respective state agencies to regulate both passenger and property transportation by motor vehicle common carriers, Alabama, Connecticut, Maine, New Hampshire and others limit this power to passenger transportation only.

Then again, while most of the regulat-

ing states apply their powers of control to carriers operating within, into and out from the limits of incorporated municipalities, California, Ohio and Oregon merely exercise authority over such transportation that is not confined solely to the limits of a city, town or other similar form of incorporated municipality.

As another and final illustration most state laws regulating motor vehicle common carriers narrow the scope of such control to vehicles operating "between fixed termini or over a regular route." In the Arizona law this expression is defined to mean the termini between which or the route over which a carrier usually or ordinarily operates his motor vehicle "even though there may be departures from said termini or route, whether such departures be periodic or irregular." As a rule it is made a question of fact for the fact state agency exercising control to determine if the carrier is operating "between fixed termini or over a regular route."

Powers of State Agency.

With very few exceptions the powers wielded by the Public Service Commissions or similar forms of state agencies over common carrier transportation by motor vehicles are extremely numerous and broad. A consultation of the chart shows that these powers can be listed as follows:

- (1) Grant, refuse to grant, amend or revoke certificates of public convenience and necessity.
- (2) Prescribe routes.
- (3) Fix schedules.
- (4) Determine character of service and promote the comfort and safety of traveling public.
- (5) Establish fares and rates.
- (6) Require reports and uniform methods of accounting.
- (7) Examine accounts and records.
- (8) Supervise fiscal affairs such as incorporation, capitalization of stock, etc.
- (9) Compel additions to, extensions of or betterments in physical equipment.

It is apparent that these powers are practically unlimited and of such a nature that the state agency has almost absolute control over the life or death of motor transportation within its jurisdiction. Nevertheless all of the rulings of the various commissions are subject to review by the proper courts and aggrieved parties can easily and

freely appeal for redress of wrongs or supposed wrongs.

Furthermore, in the all important matter of certificates of public convenience and necessity decisions are usually made contingent on public hearings at which applicants for such certificates, other agencies of transportation serving the same territory and the general public are given full opportunity to present facts and opinions on the subject.

Up to this point in the discussion the entire subject has been approached from the standpoint of the state's power. It is now desirable to look at the question from the side of the operator of a motor vehicle common carrier, especially to learn what steps he must take in order, either to stay in business after a state adopts the policy of regulation or enter the business anew.

In a few states, as New Hampshire, for instance, it is only necessary for the operator to obtain a permit from the state authority. This is the rare exception, however, rather than the rule. In nearly every other state a certificate of public convenience and necessity is required; while in Colorado, New York and Wisconsin a permit from the governing bodies of the municipalities in which the common carrier seeks to operate must also be secured.

In several states motor vehicle common carriers established at the time the law first went into effect have been expressly exempted from this requirement making it necessary for none but operators beginning business after the passage of the law to obtain certificates of public convenience and necessity. In Connecticut, however, and in general in every other state, established, as well as new motor vehicle common carriers, have been obliged to demonstrate to the state agency their right to exist after the state control act has been written into the statute books. Obviously, this has very often meant real hardship to those who have invested substantial sums of money in motor vehicles and have built up paying businesses over certain routes only to be obliged to abandon everything.

While in the imposition of annual registration fees and other forms of taxes upon motor vehicles, state legislatures have in only a few cases discriminated between motor vehicle common carriers and private carriers, nevertheless, they have drawn a sharp line between motor vehicles used privately by their owners and those operated for hire.

By way of illustration, in Maine a motor vehicle used for hire must pay pay twice the normal annual registration fee for the class of vehicles to which it belongs. No extra or special charge, however, is made when this vehicle is engaged in the common rather than the private carrier business.

It will be noted from the seventh column of the tabulation that in practically every case where there is state regulation this course pursued and special and greater fees in lieu of the regular annual registration fees are im-

posed or else extra burdens are added to those usually imposed by the state on motor transportation.

In connection with the foregoing discussion it is of interest to note that the laws of Colorado expressly authorize the municipalities of the state to acquire, own and operate motor vehicle common carriers, while in Connecticut the street railway lines are given this same power with respect to passenger-carrying motor vehicles.

Another point worth noting is that while some states have not gone so far as to place motor vehicle common carriers under the full regulation of a state agency of government, nevertheless, they have enacted laws with a measure of such control in view. To illustrate: In Louisiana a statute approved in 1918 defines a power driven vehicle carrying passengers or freight for hire over the highways outside of incorporated municipalities as a "Service Car." Operators of service cars are obliged to procure from the police juries of the parishes in which they reside, certificates of their ability and skill to operate and furnish indemnity bonds against claims arising from injury to persons or damage to property.

A variation from the type of local control exemplified by Massachusetts is that which obtains in Delaware, where the Wilmington Board of Public Utility Commissioners has, with regard to motor vehicle common carriers transporting persons, prerogatives and exercises functions similar to those set forth in this report for the general form of state control.

As has already been observed, the power of the state agency exercising control is usually laid down in the law in general language which is generally so broad and comprehensive that it covers every possible phase of the motor vehicle common carrier business. This control then finds concrete expression in rules and regulations promulgated by the state agency from time to time as occasion warrants. For instance in Nebraska the Nebraska State Railway Commission entered an order on May 21, 1919, that beginning July 1 of the same year, the motor vehicles holding themselves out to carry freight for hire in a certain portion of the state should establish, maintain and apply a prescribed schedule of rates on freight to be classified in accordance with so-called General Order No. 24. In no other portion of the state nor in any other particular did the commission assert its prerogatives. Furthermore, on April 20, 1921, it rescinded and annulled this order.

As an illustration of an entirely different tendency, in Washington state, where the law placing motor vehicle common carriers under control of the Department of Public Works went into effect last year, General Order M. V. No. 1, issued June 9, 1921, provides a very elaborate set of "rules and regulations governing the transportation of persons and property for compensation over any public highway." These cover the procedure for obtaining a certificate of public convenience and necessity for a certain number of prescribed vehicles; what must be done for permission to operate more ve-

hicles in case of emergency; the sale, transfer or mortgaging of certificates; passenger and freight tariffs; rates; free passes; schedules, including changes in or discontinuance thereof; liability and property damage insurance; obligatory equipment including necessity to carry extra tires, speedometers, heating system for passenger carrying vehicles, fire extinguishers, route signs, etc.; operating regulations including in addition to the requirements of the state motor vehicle law, provisions as to the character and conduct of drivers, taking on of passengers and seating thereof, baggage, comfort stations, etc.; fees additional to the state registration fees; annual reports, etc.

Any discussion of state regulation of the motor vehicle when used as a common carrier would be incomplete without reference to the arguments for and against such regulation. In so doing, however, the opinion frequently expressed that railroad and trolley companies, as a result of the severe competition of motor transportation, are seeking state regulation as a means of killing off such competition, will be totally disregarded, and only such arguments recorded as are predicated on public welfare, sound economics and strict impartiality.

Arguments Pro.

With these premises therefore those who contend for state regulation say that such control is necessary:

(1) Because motor transportation for hire is a public utility and as such should be regulated along with other public vehicles so that travelers and shippers by such means can be made sure of safe, prompt, regular, adequate, efficient and economical service.

(2) So that, in all cases where motor vehicle common carriers come, or are likely to come, in ruinous competition with other common carriers, the state can step in and determine whether public convenience and necessity require such competition, and save, if desirable, the pre-existing agencies of transportation.

(3) In order to shoulder upon the motor vehicle common carrier obligations, financial and otherwise, in return for the rights given it to operate for a profit over all or certain highways within a state especially so since the highways are built and maintained by the public. In some cases these rights take the form of valuable franchises which virtually grant monopolistic privileges over certain routes.

(4) For the purpose of eliminating the irresponsible, so-called "fly-by-night" companies and individuals who, while undergoing certain destruction for themselves, pull down with the ruin well managed motor transportation agencies which render a real public service and are entitled to a reasonable return on their investments and a stabilization of their business.

Arguments Con.

In objection to these arguments for state regulation of the motor vehicle common carrier, opponents of the proposition maintain:

Summary of Salient Features of State Laws Regulating Motor Vehicles

State	Law in- ef- fect	State Agency Exercising Control	Application of Control	Prerequisites of Operation	General Powers of State Agency, Etc.	Special or Extra State Taxes
Alabama	1919	State Tax Commission	Passenger transportation only. Within, out from and into municipalities.	Filing of written statement showing terminal points of routes to be covered. Obtaining of special license.	..... x	In lieu of regular registration fees, the following Seating capacity 5 pass. or less .....\$37.50 Seating capacity over 5 pass., less than 10 60.00 Seating capacity over 10 pass. 90.00
Arizona	1919	Corporation Commission	Passenger and property transportation. Within, out from and into municipalities.	Certificate of Public Convenience and Necessity. Indemnity bond as conditioned by Commission.	General control over granting of Certificate of Public Convenience and Necessity; regulating service; fixing rates and fares.	..... x
Arkansas	x	Railroad Commission	Passenger and property transportation. Out from and into municipalities only.	Certificate of Public Convenience and Necessity.	Grant, refuse, suspend, revoke or amend Certificates of Public Convenience and Necessity; prescribe service or extensions thereof; fix rates and fares, supervise fiscal affairs; authorize sale or lease of certificates.	..... x
California	1917	Public Utilities Commission	Passenger and property transportation. Within, out from and into municipalities.	Permission from municipalities to operate. Certificate of Public Convenience and Necessity.	Wide control over issuance of Certificates of Public Convenience and Necessity; prescribe service or extensions thereof; fix rates and fares; promote health, safety and convenience of operation. Municipalities may purchase and operate motor vehicle common carriers.	..... x
Colorado	1915	Public Utilities Commission	Passenger and property transportation. Within, out from and into municipalities.	Certificate of Public Convenience and Necessity. Indemnity insurance based on seating capacity; range \$5000 to \$10,000 per vehicle.	Grant or withhold Certificate of Public Convenience and Necessity. Street railroad companies may acquire, own and operate motor vehicles for hire.	Special registration fees for passenger carrying motor vehicles: Seating 9 pass. or less, \$20; for each additional seat of capacity .....\$1
Connecticut	1921	Public Utilities Commission	Passenger transportation only. Within, out from and into municipalities.	..... x .....	..... x	Extra registration fees as follows: Regular fees plus \$15 for vehicle with seating capacity of 5 or less; over 5 but under 21, \$2 per seat over 5; 21 but under 41, \$5 per seat over 20; 41 or over, \$10 per seat over 40.
Delaware	x	..... x .....	..... x .....	..... x .....	..... x	Special registration fees: For passenger carrying vehicles: seating capacity 7 or less, \$5 per seat; over 7 but less than 17, \$7.50 per seat; 17 or over, \$10 per seat in addition to 75 cents per 100 lbs. gross weight of vehicle and load. For property carrying vehicles, \$1.50 per 100 lbs gross weight on pneumatic tires; \$2.25 per 100 lbs. on solid tires.
Florida	x	..... x .....	..... x .....	..... x .....	..... x	Special registration fees for passenger carrying vehicles with a seating capacity of ten or more, \$75.
Georgia	1917	Railroad Commission	..... x .....	..... x	The Commission holds that it has jurisdiction over motor vehicle common carriers, but has not as yet had occasion to exercise this power.	..... x
Idaho	x	Commerce Commission	Passenger and property transportation. Within, out from and into municipalities.	Certificate of Public Convenience and Necessity. Adequate indemnity insurance or sworn statement of ability to meet any possible damage claims.	Grant, refuse, alter, modify Certificates of Public Convenience and Necessity. Regulate rates, fares, service, contracts, practices, etc.	Extra state tax on property carrying vehicles not operated exclusively within a municipality. Gross weight 12,000 lbs. or less, one cent per mile; over 12,000 lbs., two cents per mile. On passenger carrying vehicles gross weight 12,000 lbs., or less, 1/15 cent; over 12,000, but not more than 15,000 lbs., 1/6 cent; over 15,000 lbs., 1/6 cent per mile.
Illinois	1921	..... x .....	..... x .....	..... x .....	..... x .....	..... x
Indiana	x	..... x .....	..... x .....	..... x .....	..... x .....	..... x
Iowa	x	..... x .....	..... x .....	..... x .....	..... x .....	..... x
Kansas	x	..... x .....	..... x .....	..... x .....	..... x .....	..... x
Kentucky	x	..... x .....	..... x .....	..... x .....	..... x .....	..... x
Louisiana	x	..... x .....	..... x .....	..... x .....	..... x .....	..... x
Maine	1921	Public Utilities Commission	Passenger transportation only. Within, out from and into municipalities.	Certificate of Permission.	Make rules and regulations governing operation; fix fares, regulate routes and schedules, etc.	Special registration fee for passenger carrying up to 8; \$3 per passenger, 8-25; \$5 per passenger over 25.
Maryland	1916	Public Service Commission	Passenger and property transportation. Within, out from and into municipalities.	Annual Permit.	Grant or refuse permits Make rules and regulations governing operation. Fix rates, fares, schedules, etc. Provide for safety and convenience of traveling and shipping public.	Extra State Registration fee amounting to 100% over normal fee.
Massachusetts	x	..... x .....	..... x .....	..... x .....	..... x	Special fee \$1.20 per hp.
Michigan	x	..... x .....	..... x .....	..... x .....	..... x .....	..... x
Minnesota	x	..... x .....	..... x .....	..... x .....	..... x .....	..... x
Mississippi	x	..... x .....	..... x .....	..... x .....	..... x .....	..... x
Missouri	x	..... x .....	..... x .....	..... x .....	..... x .....	..... x
Montana	x	..... x .....	..... x .....	..... x .....	..... x .....	..... x
New Hampshire	1919	Public Service Commission	Passenger transportation only. Within, out from and into municipalities.	Permit to operate. Indemnity bond of \$600 per vehicle plus \$100 per person of seating capacity.	Grant or refuse permits. Establish regulations governing rules and regulations governing operation.	25% extra registration fee for property carrying motor vehicles and passenger carrying motor vehicles seating more than seven passengers.

Nebraska	1919	State Railway Commission	Commissioned as only asserted jurisdiction over property transportation out from and into municipalities.	..... x	Commission in 1919 issued an order affecting rates and classifications of property carried by motor vehicle common carriers out from and into municipalities. Order rescinded in 1921.	..... x	Extra annual tax of \$2 per 100 pounds gross weight for operating on first class highways. \$1 per 100 pounds on second class; 25c per 100 pounds on other than first and second class. Special registration fees as follows: 5 passenger or less, \$15; 6 to 8 persons, \$17.50; 9 to 12 passengers, \$20; 13 to 17 passengers, \$25; 18 to 22 passengers, \$30; 23 to 26 passengers, \$35; 27 to 30 passengers, \$40; over 30 passengers, \$40; plus \$2 per seat in excess of 30.
Nevada	1919	Public Service Commission	Passenger and property transportation. Within, out from and into municipalities.	..... x	Certificate of Public Convenience and Necessity. Indemnity bond not less than \$500 nor more than \$10,000 per vehicle.	..... x	Extra annual registration fees as follows: 5 pas. or less, \$15; 21-22 pas., \$55; 6-7 passenger, \$24.50; 23-26 pas., \$61.50; 8-10 pas., \$30.50; 27-30 pas., \$67.50; 11-16 pas., \$43; over 30 pas., \$67.50; 17-20 pas., \$52; plus \$2 per pas. over 30.
New Jersey	1921	Board of Public Utilities	Passenger transportation only and solely where it parallels street railway lines. Within, out from and into municipalities. Only applicable to lines established after March 16, 1921.	..... x	Indemnity bonds of \$5000 by municipalities in which lines operate.	..... x	Schedule not applicable to omnibus operating wholly within municipality under franchise granted by said municipality. Extra registration fee, 50% over normal. Extra registration fee for passenger carrying vehicles, 25c per passenger of seating capacity allowing 16 inches of seating space per passenger.
New Mexico	x	Public Service Commission	Passenger transportation only. Within, out from and into municipalities.	..... x	Consent of municipal authorities. Certificate of Public Convenience and Necessity. Indemnity bond as conditioned by the local authorities.	..... x	For passenger carriers extra registration fee of \$4 per passenger allowing 20 inches of seating space per passenger. For property carriers extra registration fee of 50c per inch of total tire width. In addition for both passenger and property carriers an annual fee for administration of motor vehicle common carrier laws of not more than \$10 per vehicle.
New York	1915	Public Service Commission	Passenger and property transportation. Within, out from and into municipalities.	..... x	Consent of municipal authorities. Certificate of Public Convenience and Necessity. Indemnity bond as conditioned by the local authorities.	..... x	Extra registration fee of 100% over normal fee.
North Carolina	x	Board of Railroad Commissioners	Passenger and property transportation. Within, out from and into municipalities.	..... x	..... x	..... x	Carrying persons or property for hire between municipalities \$32 to \$160, plus 1/2c to 4c per mile traveled according to net carrying capacity.
North Dakota	1919	Public Service Commission	Passenger and property transportation only. Out from and into municipalities only.	..... x	..... x	..... x	Extra annual tax of \$5 per vehicle in cities and towns of less than 5000 population; \$10 per vehicle where population is 5000 or over.
Ohio	1921	Public Service Commission	Passenger and property transportation. Out from and into municipalities only.	..... x	..... x	..... x	Extra annual registration fees: Passenger carriers, for vehicles with seating capacity of 8 or less, \$10; 50c per passenger over 8. For property carriers, \$10 for vehicle of 3 tons or less capacity; \$1 per ton of capacity over 3 tons.
Oklahoma	x	Public Service Commission	Passenger and property transportation. Out from and into municipalities only.	..... x	..... x	..... x	For passenger carriers extra registration fee of \$4 per passenger allowing 20 inches of seating space per passenger. For property carriers extra registration fee of 50c per inch of total tire width. In addition for both passenger and property carriers an annual fee for administration of motor vehicle common carrier laws of not more than \$10 per vehicle.
Oregon	1921	Public Service Commission	Passenger and property transportation. Within, out from and into municipalities.	..... x	..... x	..... x	Extra registration fee of 100% over normal fee.
Pennsylvania	1914	Public Service Commission	Passenger and property transportation. Within, out from and into municipalities.	..... x	..... x	..... x	Carrying persons or property for hire between municipalities \$32 to \$160, plus 1/2c to 4c per mile traveled according to net carrying capacity.
Rhode Island	x	Public Service Commission	Passenger and property transportation. Within, out from and into municipalities.	..... x	..... x	..... x	Extra annual tax of \$5 per vehicle in cities and towns of less than 5000 population; \$10 per vehicle where population is 5000 or over.
South Carolina	x	Public Service Commission	Passenger and property transportation. Within, out from and into municipalities.	..... x	..... x	..... x	Extra annual registration fees: Passenger carriers, for vehicles with seating capacity of 8 or less, \$10; 50c per passenger over 8. For property carriers, \$10 for vehicle of 3 tons or less capacity; \$1 per ton of capacity over 3 tons.
South Dakota	x	Public Service Commission	Passenger and property transportation. Within, out from and into municipalities.	..... x	..... x	..... x	For passenger carriers extra registration fee of \$4 per passenger allowing 20 inches of seating space per passenger. For property carriers extra registration fee of 50c per inch of total tire width. In addition for both passenger and property carriers an annual fee for administration of motor vehicle common carrier laws of not more than \$10 per vehicle.
Tennessee	x	Public Service Commission	Passenger and property transportation. Within, out from and into municipalities.	..... x	..... x	..... x	Extra registration fee of 100% over normal fee.
Texas	x	Public Service Commission	Passenger and property transportation. Within, out from and into municipalities.	..... x	..... x	..... x	Carrying persons or property for hire between municipalities \$32 to \$160, plus 1/2c to 4c per mile traveled according to net carrying capacity.
Utah	1918	Public Utilities Commission	Passenger and property transportation. Within, out from and into municipalities.	..... x	..... x	..... x	Extra annual tax of \$5 per vehicle in cities and towns of less than 5000 population; \$10 per vehicle where population is 5000 or over.
Vermont	x	Public Utilities Commission	Passenger and property transportation. Within, out from and into municipalities.	..... x	..... x	..... x	Extra annual registration fees: Passenger carriers, for vehicles with seating capacity of 8 or less, \$10; 50c per passenger over 8. For property carriers, \$10 for vehicle of 3 tons or less capacity; \$1 per ton of capacity over 3 tons.
Virginia	x	Public Utilities Commission	Passenger and property transportation. Within, out from and into municipalities.	..... x	..... x	..... x	For passenger carriers extra registration fee of \$4 per passenger allowing 20 inches of seating space per passenger. For property carriers extra registration fee of 50c per inch of total tire width. In addition for both passenger and property carriers an annual fee for administration of motor vehicle common carrier laws of not more than \$10 per vehicle.
Washington	1921	Department of Public Works	Passenger and property transportation. Within, out from and into municipalities.	..... x	..... x	..... x	Extra registration fee of 100% over normal fee.
West Virginia	1921	State Road Commission	Passenger and property transportation. Within, out from and into municipalities.	..... x	..... x	..... x	Carrying persons or property for hire between municipalities \$32 to \$160, plus 1/2c to 4c per mile traveled according to net carrying capacity.
Wisconsin	1915	Railroad Commission	Passenger and property transportation only. Within, out from and into municipalities.	..... x	..... x	..... x	Extra annual tax of \$5 per vehicle in cities and towns of less than 5000 population; \$10 per vehicle where population is 5000 or over.
Wyoming	x	Railroad Commission	Passenger and property transportation. Within, out from and into municipalities.	..... x	..... x	..... x	Extra annual registration fees: Passenger carriers, for vehicles with seating capacity of 8 or less, \$10; 50c per passenger over 8. For property carriers, \$10 for vehicle of 3 tons or less capacity; \$1 per ton of capacity over 3 tons.

(1) That granted motor transportation for hire is a public utility, public interest can best be served by unrestricted competition and complete freedom from regulation in which none but the fittest can survive. This policy they contend will yield to passengers and shippers the maximum of results with the minimum of cost.

They deny any analogy between motor vehicle common carriers and railroad and trolley transportation agencies, pointing out that the latter by virtue of private ownership of franchises, rights of way, road beds, tracks and terminals have an exclusive and monopolistic control over all transportation on their routes. Motor truck operators, on the other hand, even where granted a monopoly of transportation for hire over a certain prescribed highway or portion thereof cannot deny the use of that highway to others who wish for themselves or as private carriers to transport persons or property over those same routes.

Finally, they point out that governmental regulation of rail and trolley common carriers came after these agencies had abused their rights and privileges and through pools, stifling of competition, exorbitant increase of rates, discrimination, stock watering etc., made it necessary for the public in self-protection to subject them to control. By the very nature of the service these evils are impossible with motor transportation since the road is free to the use of everyone and motor vehicles the medium for transportation over the roads are quickly, cheaply and in unlimited numbers available for everyone.

(2) Since the obvious outcome of the first argument advanced against state regulation is "cut-throat" competition between various forms of transportation attempting to serve a certain territory and per se between the motor transportation companies themselves operating in competition over certain highway routes, the opponents of state regulation cannot escape the query whether they are willing to face the logical consequences of such a struggle. Without hesitation they answer that wherever rail, trolley or any other form of transportation for hire cannot stand up before a newer and better form, public interest demands that it should give way; likewise within that newer and better form of transportation, the rule should be survival of none but the most efficient and economical agencies. They are confident that even though such a policy may mean the destruction at times of more or less invested capital, as it did when rail and inland water transportation first came into acute competition, the final economic benefits to the community as a whole will many times compensate for the loss involved.

(3) As for shouldering upon motor transportation for hire financial and other burdens which it should rightly carry, opponents of state regulation say that legislative bodies have not heretofore found it necessary to establish such control in order to determine the weight limits for motor vehicles used as common carriers; their registration fees and other charges; their liability to the pub-

lic for injury to persons or damage to property; etc. If this is all that is involved it is not sufficient to warrant almost unlimited regulation in all other respects by a state agency.

(4) Lastly those against state regulation believe that the natural working out of economic laws will do more to stabilize the motor transportation for hire business than extensive interference on the part of governmental agencies of any sort. They feel that the proposition is paternalistic and will result either in discrimination in favor of one or more types of transportation, and against all the rest, or else that it will promote monopolistic advantages for certain motor transportation companies and that through it all the traveling and shipping public will pay the cost.

Pending Legislation.

In even numbered years the activities of state legislatures are relatively light since no more than 11 or 12 state law making bodies get together in regular session while few of the others meet in special session. Notwithstanding this fact 1922 is producing a big crop of bills dealing with motor vehicle common carriers. The Arizona state legislature now in special session and the current regular sessions of the Maryland, New Jersey and New York state legislatures are considering extensions of the existing powers of their state agencies exercising control over motor vehicle common carriers. On the other hand in Kentucky, Massachusetts, Mississippi, Rhode Island, South Carolina and Virginia where the state legislatures are in regular session, and where as yet there is no such regulation, many measures aiming to bring about a greater or less amount of such control are now receiving the careful consideration of the legislators.

In this connection it is interesting to note that in New Jersey the strongest and most active opponents of state regulation and the extension thereof, have introduced and are striving to bring about exclusive power in the premises for the local incorporated municipalities. Apart from any other arguments pro and con for such local control, it must be apparent that the operation of a motor vehicle common carrier beyond the confines of a single municipal jurisdiction of a state becomes extremely complicated and burdensome under such circumstances and is likely to suffer from the varying policies of constantly shifting local governing bodies.

Another interesting movement to note in some states is proposed legislation to require every common carrier motor vehicle engaged in the transportation of passengers to have both a front and rear entrance, while in Maryland a pending measure would require not only a chauffeur but also a conductor on every such vehicle. This would seem to indicate that some state law makers seek to rewrite in motor bus transportation the full crew laws which for a long time have been an economic burden for the railroads.

Position of Conference Committee.

The motive of this discussion of state regulation of motor vehicles used for hire

is informative only. It is not intended and in no way must be regarded as favoring either one side or the other of the question. For this reason the conference committee will appreciate greatly any information; arguments pro and con; comments; corrections or criticisms which all those who read this discussion may have to offer, especially if such material includes the practical experiences that have resulted from regulation by the states where it is now in force. How important this is can be seen from the fact that in 1923 the legislators of 42 states will meet in regular session and doubtless be called upon to make decisions on scores of bills vital to motor vehicle common carriers. The conference committee hopes at that time to be of service in laying before all concerned facts and arguments which will facilitate the passage of only such laws as are scientifically correct and fair alike to motor vehicle common carriers; competing common carriers and the public.

From a preliminary report based on state laws in force Jan. 1, 1922, and on bills pending before state legislatures in session March 1, 1922.

Publication authorized by Motor Vehicle Conference Committee, 366 Madison avenue, New York.

American Automobile Association, Motor & Accessory Manufacturers Association, National Automobile Chamber of Commerce, Inc., National Automobile Dealers' Association, Rubber Association of America, Inc., Trailer Manufacturers' Association of America.

Frank King is no longer works manager for the Holcomb & Hoke Mfg. Co., Indianapolis, but is now filling the position of factory manager for the Dearborn Truck Co., Chicago.

A. L. Morgan has accepted a position as draftsman for the Parker Motor Car Co., Montreal, Quebec. He was formerly chief engineer for Charles W. Burroughs, also of Montreal.

J. D. Hammond is now a draftsman for the Detroit Motor Co., Washington, Pa. He was previously maintenance superintendent for the Hayes Wheel Co., Jackson, Mich.

William Schroeder, formerly chief engineer for Karry-Lode Industrial Truck Co., Long Island City, N. Y., now holds a similar position with the Eleveyor Electric Industrial Truck Co., Brooklyn, N. Y.

William F. Goff has severed his connection as engineer for the Sullivan Motor Truck Corporation, Rochester, N. Y. He has not announced his plans for the future as yet.

F. E. Fick, formerly connected with the tool engineering department of the Warner, Swasey Co., Cleveland, has become automobile design checker for the White Co., also of Cleveland.

George W. Cravens has been elected president of the Climax Engineering Co., Clinton, Iowa.

F. C. Moore has been elected president of the Canton Forge & Axle Co., Canton, Ohio. He was previously vice-president and general manager of the Vermillion Malleable Iron Co., Hoopeston, Ill.

Let's Lower These Figures

SEVENTY-SIX THOUSAND accidental deaths—a life needlessly snuffed out every six minutes—is the astounding bill charged against careless America during 1920, according to the report of the public accident statistics committee of the National Safety Council presented at the 11th Annual Safety Congress which was held recently.

While the 1920 toll from all public and industrial accidents representing the total population of the

State of Nevada—is a decrease of 3300 over 1911, the beginning of the decade, there is only a balance of 400 on the credit side of the ledger over the 1919 total.

This record is viewed with concern by the nation's leaders of organized accident prevention, since the yearly downward tendency of accidental deaths in the United States during the past decade, constant up to 1919, came to a halt in 1920.

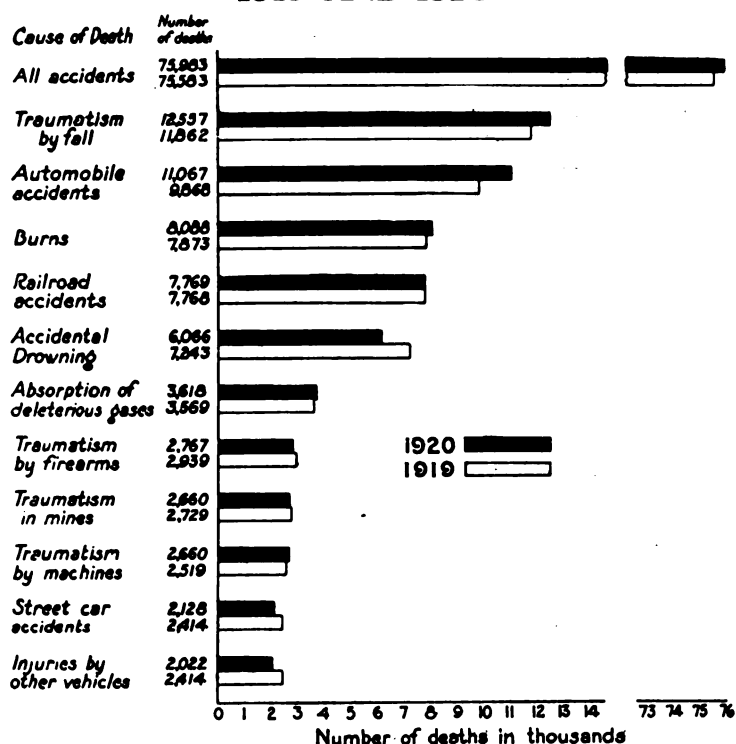
AUTOMOBILE accidents are held to be in part responsible for the unfavorable experience of 1920; in that year there were 1200 more deaths from that cause than occurred in 1919. The chief reason for this, it is pointed out, was the large increase in the number of automobile users. The automobile fatality frequency for 1920 was 30 deaths a day, a total for the year of 11,000. The 1921 estimate of auto deaths, based on figures now available from 50 of the largest cities, indicates a considerable increase over 1920. General traffic accidents in 1921, however, will show a five per cent. decrease over 1920, it is believed.

People died from falling accidents of all kinds at the rate of 34 a day, a higher rate than even automobiles. Burns claimed 22 lives a day, a total for the year of 8088 and an increase of 215 over 1919. Other major causes of accidental deaths are listed in order of importance as follows: Railroad accidents, 7769; drownings, 6066; deaths from gassing, 3618; firearms, 2767; mine accidents, 2660; machinery, 2660; street cars, 2128; other vehicles, 2022; conflagrations, 1277. Other general causes of deaths are crushing accidents, poisonings, sharp instruments, excessive heat or cold, injuries by animals, lightning and electricity.

The burden of accident mortality continues to fall chiefly upon children and upon the active working classes, according to the report which is the result of exhaustive research and statistical work on the part of the committee composed of Louis I. Dublin, chairman and chief statistician of the Metropolitan Life Insurance Company; Herbert P. Stellwagon, National Bureau of Casualty and Surety Underwriters; A. W. Koehler, New York Electric Railways, and E. W. Kopf.

Fatal accidents to children under five years number 9880, or 13 per cent. of

NUMBER OF DEATHS FROM
PRINCIPAL ACCIDENTAL CAUSES OF DEATH
IN
CONTINENTAL UNITED STATES
1919 AND 1920



the total. Young people from 15 to 24 bore 14 per cent. of the burden; those from 25 to 34, 13 per cent.; 35 to 44, 12 per cent., and those from 45 to 54, 10 per cent. of all the accidental deaths of the year. A majority of the children came to their deaths through fatal burns, deleterious gases and automobile accidents. One-third of all automobile deaths occur among children under 15 years of age.

Accidents in industry show a general decline of 1.3 deaths per 100,000 population for each year of the 10-year period, while public accidents decreased 1.1 per 100,000. The 1920 report shows public accidents on a slight upward turn, while industrial accidents declined, this in spite of increased manufacturing activities. This is said to be due to the aggressive spirit shown by industry as a whole in organizing for safer working condi-

tions. Total industrial fatalities in 1920 were set at 12,500. The 1921 total, so far as can be anticipated from figures collected from insurance companies and other agencies, will probably be still lower because of the falling off in employment.

Chief causes of industrial fatalities during the period from 1912 to 1920, as shown by figures collected by the industrial department of the Metropolitan Life Insurance Company are railroad accidents, falls of persons, machinery accidents, mines and quarries, electricity, drownings, street cars, automobile accidents, burns and gasings, listed in order of importance.

Railroad accidents, both public and industrial, showed no decline, as there were 7769 such deaths; some progress has been made, however, as past records show a total of 12,178 railroad deaths in 1911.

Over twice as many men died accidentally in 1920 as did women, the figures showing in round numbers 55,000 male fatalities as compared with 21,000 women. The latter, however, suffered greatly from domestic hazards, 6000 having died from falls and 4800 from burns; 2756 died from injuries received in automobile accidents. Auto accidents were responsible for 8300 deaths among men, while railroad mishaps caused 6930 fatalities.

A comprehensive means for collecting the information which will bring home to the American people the plain facts on the prevalence of certain kinds of accidents is included in the committee's report. Standard forms have been prepared for use in reporting all public accidents. These are to be distributed by the National Safety Council to every public accident official in the United States. In many cities these forms are already being used by the police and safety departments with good effect.

Advertising Managers' Council

(By EZRA W. CLARK, Advertising Manager, Clark Equipment Co., Buchanan, Mich., Chairman Executive Committee, Advertising Managers' Council, Motor and Accessory Manufacturers' Association.

THE Advertising Managers' Council of the Motor and Accessory Manufacturers' Association represents the advertising and sales activities of the more than 400 leading companies making parts and equipment for the automotive industry included in the membership of the M. & A. M. A.

It is the largest group of advertisers in America. From the members of this council go every week millions of separate mailing pieces; our billboards line the highways; our electric signs illuminate the busy thoroughfares of the cities; millions of readers give attention to our messages which appear in the principal papers every day; our appropriations are the main support of a strong and virile trade press represented by 18 publications, which, as a class, are the best trade publications published in America, and there is not a magazine of general circulation published here which does not carry in every issue a number of pages of our advertising copy.

THE most recent and accurate records available show that nearly \$6,000,000 will be spent this year by our members in trade and general advertising. It is to be expected that in the handling of such large sums of money there will be some losses. All of our advertising appropriations will not attain 100 per cent. efficiency, yet it is a function of this council to so guide and conserve the activities of its members that the advertising appropriation of every individual shall in a sense make more effective the advertising dollars of all the other members of the association.

How to accomplish this is one of the general objects of this council and one of the particular objects of our present conference.

Membership in this council is dependent upon two things—affiliation of your company with the M. & A. M. A., and a desire to cooperate with your fellow advertising managers in advancing the interests of the industry with which you are identified and thereby making more valuable your service to your individual companies.

No one is compelled to join the council. No one is made a member by reason of his position. It is a voluntary council composed of those who desire to make more effective their own work by helping to make more effective the work of others.

Present plans provide for three and possibly four meetings a year, of which it is hoped one will be a joint meeting with the advertising managers of the car and truck manufacturers associated with the National Automobile Chamber of Commerce—in fact, there are those of us who cherish the thought that some day we may have an Automotive Advertising Association embracing as active and associate members all those engaged in handling the sales, advertising and publicity of automotive products.

The council has no inherent executive authority. It creates and exercises its power through recommendations and endorsements. It is advisory only. Members not attending the sessions of the council receive full printed reports of its

proceedings, and when the necessity arises, bulletins will be sent out to all interested by our efficient secretary, Mr. M. Lincoln Schuster. The direction of the activities of the council is vested in the hands of an executive committee composed of the following representative men:

Mr. S. E. Baldwin, advertising manager, Willard Storage Battery Company.

Mr. J. C. McQuiston, manager, department of publicity, Westinghouse Electric and Manufacturing Company.

Mr. Jos. S. Jacobs, advertising manager, American Hammered Piston Ring Company.

Mr. Maurice Switzer, Kelly-Springfield Tire Company.

Chairman, Mr. E. W. Clark, advertising manager, Clark Equipment Company.

We are glad that this meeting of the council is being held jointly with the annual credit convention of the M. & A. M. A. The credit managers have their problems of finance; let us remember, however, that we have entrusted to our care something more valuable than the cash resources of our company; we each have in our keeping the good name and reputation of a company as well as the honor and integrity of a great industry.

He who utters a false check may steal few or many dollars, but he who utters a false advertisement imperils the very integrity of his company—that upon which all credit inherently rests.

The sessions of the council are open to the representatives of the trade and general press, and we are glad they are so fully represented here today. We welcome them and are constrained to offer one or two suggestions which we believe will not be misunderstood.

We hope the automotive trade press will set an example to the press of all other industries by sweeping all advertisements off their front covers and utilizing the space for helpful editorial comments and timely messages of the hour upon problems vital to our industry. We also hope the automobile editors of the daily press will make more use of their excellent brains and less use of the stereotype press notices.

Our young and virile industry gives birth every day to real news eliminating the necessity of fakes and fiction. We see the day when the automobile editor of our great dailies will be granted the

same prerogatives now accorded to the financial and sporting editors. One of the real problems of this council and one which will be discussed by able men at our sessions today has to do with this very subject.

The rank and file of the men who make up the advertising and sales organizations of our companies are young, enthusiastic, red-blooded men. We are not easily discouraged. Our powers of recuperation are practically unlimited, and due to this, our industry is leading the column in the return of prosperity. We do not look for better times—we have them.

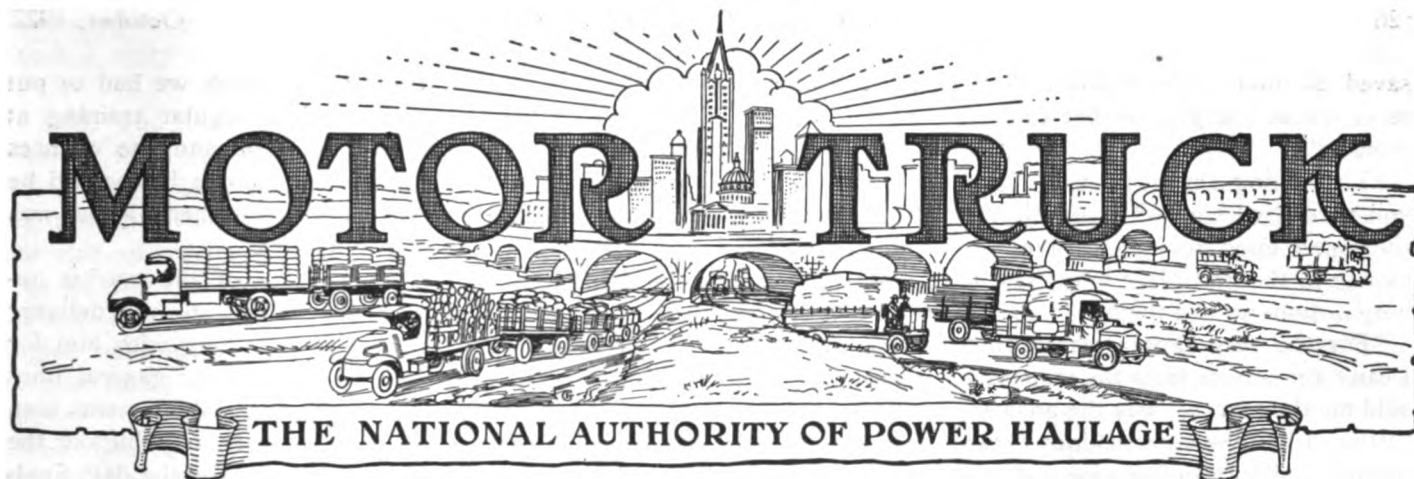
A few years ago the winter months were looked upon as a dull season among automobile men. Advertising men, however, have imaginations and we have seized upon the handicaps of this dull season to feature the closed car and closed car equipment so that now many of the larger factories look to the winter months as the busiest season of the year. The president of a large automobile company told me only the other day that fully 45 per cent. of his output for the year would be closed models. So much for the imagination and initiative of the advertising man who can convert the dull season into a harvest of orders.

The immediate future holds much of promise and encouragement for the automotive industry as is shown by a series of telegrams from our leading manufacturers which we have just received. We are striving for sales, but do not let our advertising be competitive, by which I mean that we do not have to take sales from each other, but can help in the development of broader markets, which will mean the sale of more and more cars and trucks. If we read the future accurately we will see a change in automotive advertising. We do not need to tell the public what the automobile is, but what it will do. The trend of the times shows that utility is coming to be a more vital factor in sales.

At a meeting of the advertising managers of the National Automobile Chamber of Commerce in June a very helpful address was delivered on selling cars to women. Here is a great market. Little effort has been made in the past to sell cars to women as a class.

The last two years has seen a marvelous development in the motor bus field.

*Address delivered before the Advertising Managers' Council, Motor and Accessory Manufacturers' Association, at Buffalo, N. Y., Sept. 14, 1922.



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PAWTUCKET, R. I.

OCTOBER, 1922.

Adequate Service Greatest Need of Motor Truck Industry

Investigator, Interviewing Representative Owners Finds Unsatisfactory Repair System Combines with Lack of Trained Operators to Slow Up Sales.

(By CLEVELAND GRAY.)

WHY is the light draft horse market better today than it has been for years? Why is it that one of the largest bakeries in Southern New England, for several years a user of motor trucks, has dispensed with all but one of the cars in its fleet and has gone back to horse-drawn vehicles? Why is it that the largest retail market in a well known textile manufacturing city, after a year of experimentation with light delivery vehicles has relegated them to be limbo of forgotten things and is using horses in their stead? Why is it that certain other truck operators doing business on a large scale have to a great extent replaced their motor vehicles with horse-drawn equipment?

A FARMER friend who has used a popular make of motor vehicle for the last two years only to abandon it in favor of the horse supplied a reason for his action which may be taken as representative of the whole—an answer that covers all the foregoing questions. He said that there were just two reasons for his discarding the truck; the one that he could not get proper repair service and the other that it was almost impossible for him to hire a driver who would give the truck the right attention. It was realized that in his own particular case the answer given was entirely correct, but the writer was somewhat surprised at the results of a survey made among the users mentioned at the beginning of this article which showed that this condi-

"SERVICE THAT SERVES" WILL AID PRESTIGE.

MR. GRAY in this very comprehensive straight-from-the-shoulder article, compiled after an exhaustive survey of conditions as they exist at the present writing, sounds a warning that the truck manufacturer and dealer can ill-afford to ignore. Business daily is assuming its old time health and the nation stands at the threshold of an era of prosperity. Why jeopardize the hard, constructive effort that has put the motor truck where it is today, by poor service to the man who has purchased his trucks in good faith and by his very purchase has aided the industry? The motor truck trade has never had a bed of roses—has never had a real fair break to tell the truth and has earned every bit of the prestige it now enjoys; let's see to it that this prestige continues to grow.

tion was general throughout the section in question.

The man in charge of transportation for the bakery which is now using horses in place of trucks, said that the motor vehicle absolutely was superior in every way for the delivery of bakery products—**While It Was New.**

"When we first got our trucks," said this man, "we were more than pleased with them. They are a mighty good make and I do not for one minute question that the manufacturer built them just as good as possible. While I do not profess to know a great deal about mechanics, I am confident that these trucks in every way do just what they were guaranteed by the maker to do and, as stated, when they first came into our possession they most assuredly

saved us money and enabled us to serve a much larger number of customers."

"This being the case, why have you purchased horses?" I asked. "If they were good enough to save you money in the first place why do you not continue to use them?"

"For the very simple reason that I can't get service from the man who sold me the trucks," was the answer. "When I bought the machines I was promised all kinds of service and had every reason to believe that there would be no difficulty along this line."

"For several months I needed nothing done to the machines, but finally one of the boys, hurrying with a special delivery for a banquet, managed in detouring to hit a hole in the pavement at about 25 miles an hour with the result that I needed a new axle installed on my number five truck. I won't bore you with any details about the service I got, but the fact of the matter is that I wasn't able to use the truck again for four days. You can readily see just how this crippled me when you figure that we had business enough to keep our five machines busy 14 hours a day. The loss of one was a calamity."

A little later in some manner that has not been satisfactorily explained to me as yet the connecting rod went through the crank case of number three truck—and it was a week before it was again on the road.

"Matters like this certainly don't tend to make an owner very enthusiastic over the service he is getting regardless of how good his truck may be and after a few similar experiences the big boss decided that it would be wise for us to put in a few horses even though they do not do as good work and are in every way inferior to the motor truck. As a matter of fact this using of horses by us is only temporary, as we are planning to dispose of the trucks we now have and equip with a different make on which we are positive service can be obtained without laying up the truck."

"I might also state that one of the worst features we have had to contend with in the operation of our truck is the fact that not one driver out of 10 thoroughly understands his business. We tried all kinds of help and it finally got down to this—if we wanted a man actually to understand the business of operating and

caring for his truck we had to put him through a regular training at our own expense and the chances were that as soon as he learned he would be off to another job that was easier than ours."

The operator of the market referred the writer to the delivery manager after talking with him for a few moments along general lines and this latter official, who was seen while hard at work mapping out the various deliveries for the day, finally found time to deliver himself of a few statements regarding motor truck service and the inefficiency of the average driver. His line of argument was quite similar to that of the bakery superintendent and exactly matched it in its general ideas.

This man said that he was only allowed to pay his drivers a certain sum, which would not admit of his hiring any very high class help, with the result that due to this short-sighted policy on the part of the company the motor vehicles as a rule—a majority at any rate—were incorrectly operated.

"Many of our boys start out in the morning with a big delivery,"

"Joy Car" Lives Up to Its Name

IT'S FUNNY how little is necessary to bring a ray of sunshine to unfortunate people, to cause them to smile and be happy. How they appreciate kindness. The Church Extension Society of Rochester, N. Y., has been doing a fine piece of work among the poor folks of that city.

George K. Beach of that society decided that the orphans, the poor children and the old folks needed some way to take an occasional excursion to the lake or other places for a good time, so he started a fund and soon raised enough money to purchase a Unit 30 Selden, equipped with pneumatic tires. On this a bus body of the sight seeing type was mounted. The car was named the "Joy Car" and was started at once on its mission of happiness.

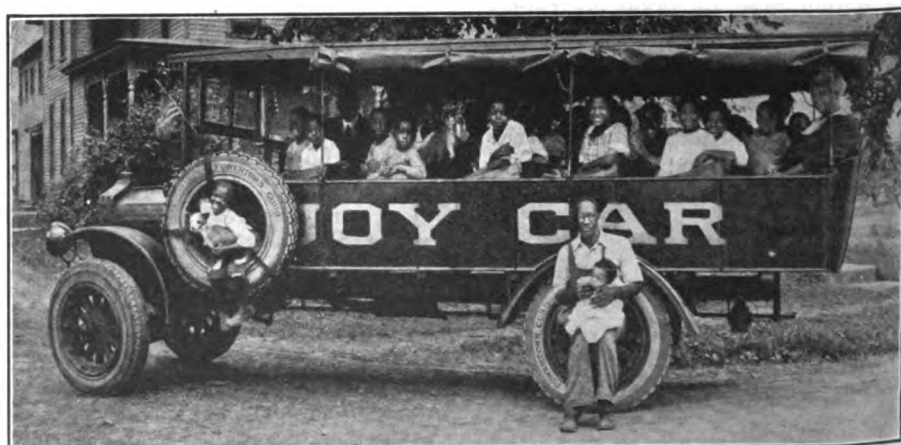
The "Joy Car" has now made over 100 trips loaded with happy

children and old folks. This bunch of folks from the Dorsey Home for Colored Children gives some idea of the way in which the Joy Car is living up to its name. Master Tiny and his "purp" fill up the spare tire.

The Joy Car idea is mighty good

and every community in the United States can afford to have one—yes, they can't afford to be without one.

Why wouldn't it be a good idea for the dealer to give a little thought to the possibilities of supplying such a car to his own community?



Isn't There Room for a Lot of These "Joy Cars" on the Road? Why Shouldn't Every Community Own One? MOTOR TRUCK Thinks It Would Be a Good Idea for Dealers to Study Into the Situation; They'd Not Only Sell Cars, but Could Feel Conscious of Having Done Something to Help Those Who Have Little Opportunity for Pleasure.

he said, "and don't stop the engine running from the time they leave the delivery platform in the morning until they return at night." (The operator of an ice business stated that he had the same trouble with his drivers who frequently kept the engine running for 12 and 15 hours at a stretch.) I happened to find one of them doing it one day and asked him if he considered it a proper thing to do. He answered that the truck cranked rather hard and for this reason he had let it run. The best truck made won't stand that kind of service day after day and unless we get proper drivers, good conscientious men who thoroughly understand the work they are doing, it is pretty hard for us to use trucks on our delivery.

"Then, too, there is the question of service.

"Our trucks, due to their careless operating and the way in which they are slammed around frequently need repairs, and the local dealer for some reason or other, seems wholly unable to cope with the situation. You might think that where we operate as many trucks as we do he would consider it policy to service them for us during the night if necessary, and in any event you would expect him to keep a proper supply of parts on hand, but such is not the case—he seems more intent on selling new installations than he does in caring for those which he already has sold and which might bring him in additional orders if he had the good sense to cooperate with the fleet owner."

This man also stated that he looked on the commercial vehicle as the logical means of delivering goods to the many hundreds of customers which his market has, but stated that until he could get lined up with some dealer whose service was as good as the machine he sold there was little likelihood of the company depending overmuch on the motor vehicle.

Others who have purchased horses recently were interviewed and their stories were similar, it being apparent from a general analysis of all complaints that it is not the truck

'TIS TRUE.

Rain trickling down a driver's neck, snowflakes spattering his cheeks, or a raw biting wind numbing his fingers and squinting his eyes have a great deal to do with the efficiency of his work and the dollar performance of the truck with which he is intrusted. It has been found by a survey of the truck owners of the country, Haulage Age believes, that the truck drivers of today take a great deal of interest in their work and appreciate the motives that prompted their employers to "switch" from horses to trucks when they, themselves, are shown consideration. "He profits most who serves best" but—he serves best who profits most.—Garford Haulage Age.

itself that is at fault, but rather it is the service station and the class of men available as drivers.

This latter phase of the situation, while it may be helped by an educational campaign of sorts lies almost wholly without the province of the industry, but the former—the question of service—is something that can be remedied by the manufacturer to a great extent—something that should be remedied at once because it is entirely probable that never before in the history of the industry has poor service in its relation to future expansion assumed such menacing proportions as at the present time. The motor truck end of the automotive industry, except for the short period of the war when nearly anything on four wheels found a ready market, has never had what might be called a real good break.

The reason for this is due to several different things, chief of which perhaps is poor highway conditions. This cause is being remedied quite rapidly, but there is still plenty of chance to speed up road building and also to build better roads.

Another factor that has tended to slow up production and sales of motor trucks has been the restrictive

legislation not only by the Federal government, but by the states as well. It is a fact that can be satisfactorily authenticated that almost no other industry has run up against so much restrictive legislation as has the motor truck and yet it has continued to progress. The two factors mentioned have done much to slow up sales, but today the business is squarely up against the problem of service in addition to its other troubles and the manufacturer who hopes to continue to distribute his product must deliver service that will as near as possible permit of a continued operation of the truck regardless of any breakdown.

The passenger car may be laid up in the garage for a few days without materially discommoding the owner, but the motor truck, because the owner makes his money only when the truck is operating, must be in a condition to run seven days in every week, all of which means that the servicing of motor trucks is actually of greater importance than the servicing of passenger cars—and yet for some reason not clearly defined the operator of the passenger car in nearly every case is given superior service than is the truck owner. Nearly every passenger automobile made is sold with the assurance that adequate service will be given—and it is. In every city of any size there are service stations carrying fairly complete supplies of passenger car parts and in most of these cities 24-hour service is given. Visit these same cities and see how many of the motor truck dealers are equipped to give similar service.

Perhaps you will be surprised at the few shops actually equipped for this important work.

The service question is of prime importance to the future of the industry and the far-sighted manufacturer of motor vehicles realizes that this is so. Several of the largest builders of motor trucks years ago foresaw that this condition would obtain and set out planning for it with the result that today they are giving better motor truck service

(Continued on Page 538.)

A. S. M. I. Recommends Traffic Regulations

THE American Society for Municipal Improvements, which has done much progressive work during the last few years, recently held a most interesting convention in Cleveland, O. Among the many reports presented to the members was that of the committee on traffic and transportation of which Professor A. H. Blanchard, University of Michigan, Ann Arbor, Mich., is chairman.

This report, which requested that members interested in efficient traffic regulations and the economic development of highway transport submit criticisms and suggestions relative to the several subjects presented prior to July 1, 1923, was considered of major importance and was well received by the convention. The report in full follows:

"THIS report is devoted to tentative recommendations which the committee requests be discussed at the 1922 convention and also asks that members interested in efficient traffic regulation and the economic development of highway transport submit criticisms and suggestions relative to the several subjects presented herewith to the chairman of the committee prior to July 1, 1923, as it is the intention of the committee to present recommendations relative to these subjects for final adoption at the 1923 convention.

Weights and Dimensions of Motor Trucks—Members of the society are urged to discuss with the members of their state legislatures the following dimension and weight regulations for motor trucks with a view to incorporating sane regulations in state laws which would be effective in all cities within a state passing such legislation.

Maximum width of motor truck chassis or body, 96 inches.

Maximum overall height from base of tire to highest point of vehicle or load, 12 feet six inches.

Maximum overall length vehicle, body and load, 30 feet.

Maximum weight per linear inch of width of solid rubber tires, measured at the base of the rubber, 800 pounds.

Maximum gross weight on one axle, 22,000 pounds.

Maximum gross weight of motor truck and load, 28,000 pounds.

In its 1923 report your committee intends to present recommendations pertaining to trailers and maximum speeds for motor trucks and trailers operating within cities on different classes of streets for different types of motor trucks and

trailers and would appreciate the cooperation of members of the society in submitting recommendations to its chairman before July 1, 1923.

Financing of the Reconstruction of Streets—Your committee submits, for your consideration, the proposal that the cost of reconstructing pavements and foundations on streets in business districts and main through trunk thoroughfares be financed by general appropriations and in no cases of such streets by assessment against abutting property.

License Fees for Motor Vehicles—Your committee asks criticisms of the following tentative conclusion: That no license fees be charged for the operation or ownership of motor vehicles by any city, but that all such license fees should be collected by the state and that a certain proportion thereof should be distributed to the cities by the state and be credited to the street maintenance funds.

Franchises for Freight and Passenger Highway Transport Intercity and Rural Express Companies—Your committee tentatively recommends that each highway transport company operating an express freight or passenger service on a definite route and in accordance with a time schedule should be required to obtain a franchise from a state commission, particularly appointed for this purpose, and should be required to secure the permission of all cities through which it operates to use a definitely prescribed route therein.

Sign Posting for Through Routes in Municipalities—Your committee suggests that at all corners at which turns are made on through routes in municipalities, direction signs be

erected, and, at the city limit on each route, a large map sign be erected, which will show the plan of all through routes in the municipality, giving the names of the streets and the principal adjoining cities to which each route leads.

Safety Car-Stop Zones—Your committee tentatively recommends that raised car-stop safety zones be universally employed in place of safety zones designated by limit lines, stanchions or mushrooms. Your committee also recommends that no stopping, ranking or parking be allowed at the curb opposite the safety zones and for a distance of 10 feet each side of the safety zones.

Railroad Grade Crossings Within Municipalities—Railroad grade crossings are a constant source of accidents. It is evident that their total elimination is desirable, but unfortunately is not practicable in all cases in the present state of the financing of highway improvements. Much can be done by proper design to reduce traffic hazards in the case of railroads crossing highways at grade. A clear sight of the railroad crossing for 500 feet on each side materially reduces accidents and a clear sight of the railroad for 1000 feet on each side of the highway is desirable. The width of all roadways crossing railroads should be at least 20 feet. For a distance of 100 feet on each side of the railroad the grade of the highway should be level or not over two feet rise or fall in 100 feet. The suggestion by some officials to construct humps in the highway to slow down traffic approaching railroad crossings is unreservedly characterized as pernicious.

Proper danger signs should be lo-

cated at 200 feet each side of grade crossings in municipalities and, in sections which are poorly lighted at night, a large electrically lighted rectangular sign carrying the word "Danger" in red letters should be suspended directly over the center of the street at the grade crossing.

Traffic Regulations for Municipalities—Your committee recommends the adoption, as far as practicable, of uniform traffic regulations for vehicles and pedestrians in municipalities. It is the intention of the committee to present a complete set of fundamental regulations in its 1923 report. In this report there is included only regulations relative to which there may be differences of opinion. It is requested that the members of the society discuss these regulations with the chief of police of the city in which they reside and submit suggestions and criticisms to the chairman of the committee prior to July 1, 1923.

Vehicular Traffic Regulations.

No person shall operate an automobile, motorcycle or other motor vehicle on any street or public highway in the business or public highway in the business portion of the municipality at a greater rate of speed than 15 miles an hour, or on any boulevard, drive or parkway at a greater rate of speed than 15 miles an hour, provided such parkway or boulevard drive shall have signs placed at the entrance thereof to indicate such rate of speed, or on any street or public highway elsewhere in the municipality at a greater rate of speed than 20 miles an hour.

Vehicles turning to the left into another street shall pass to the right of and beyond the center of street intersections, before turning, and in congested districts where traffic policemen are stationed at street intersections, an approaching automobile or vehicle shall signal the officer and shall not pass such officer until receiving proper signal from said officer.

Any person or persons operating or driving any motor vehicle or other vehicle shall, at the intersection of any public street or highway, within the limits of the municipality, keep to the right of the intersection

of the center of such street or highway when turning to the right of such intersection.

When vehicles approach an intersection of two or more public streets or highways the vehicle approaching from the right of the driver shall have the right of way.

No vehicle shall turn to proceed in the opposite direction except at street intersections.

A vehicle shall not stop on a crosswalk nor within the intersection of two or more roadways.

No vehicle shall stop on any street except within one foot of the curb, or in such way as to obstruct free passage on the street, provided that this rule shall not apply when a driver of a vehicle is compelled to stop for a standing street car.

Drivers of motor vehicles before starting, turning, stopping, backing or changing their course, shall make sure that such movement can be made with safety and shall give definite visible signal of such intention.

MOTOR TRUCK COMPETITION.

The American Railway Express Company is making an open fight against the motor truck as a common carrier, or rather against the policy of permitting motor trucks to operate over the highways as common carriers without paying for the privilege. Some interests are also urging the railroad companies to undertake a similar fight. This matter is fraught with many difficulties, and will be rather difficult of adjustment. Some advocate that trucks engaged in such service be classed as common carriers, but this is not feasible. However, such vehicles will doubtless be called upon to pay for the use of the highways in proportion to the damage they do or the revenue they earn from such service. Some states have already arranged a special tax graded according to the carrying capacity of the vehicle.—A. E. A. Leader.

No vehicle shall stop anywhere in the city with its left side to the curb.

Each bicycle shall be equipped with a suitable horn or bell for giving warning or signal of its approach and, during the hours when lights on the streets are lighted, shall be equipped with a suitable head light.

The chief of police may, from time to time, prohibit or regulate the stopping, ranking or parking of motor vehicles or other vehicles in any district where such stopping, ranking or parking will interfere with traffic or the public safety, and no vehicle shall be parked at any time within 15 feet of any fire hydrant.

Not more than two persons shall occupy the front or driver's seat of an automobile, except that a child less than 10 years of age may occupy the front or driver's seat as a third person and no person, adult or minor, shall be seated in the lap of the driver nor shall the driver be seated in the lap of a person when the automobile is in motion.

No motor vehicle having an overall length greater than 20 feet shall be diagonally or perpendicularly parked at a street curb except when loading or unloading.

Pedestrian Traffic Regulations—Except where safety zones are established pedestrians shall stand on the sidewalk while waiting for street cars until the street car is within two hundred (200) feet or less from the stopping place and when alighting from street cars pedestrians shall not stand in the street, but shall proceed immediately to the sidewalk to the right, except where safety zones are provided.

Pedestrians shall not step from the sidewalk nor from between or back of vehicles in crossing a street without looking in both directions to see approaching vehicles, and shall cross only at right angles with the street.

It shall be the duty of all pedestrians to observe the line of traffic at street intersections and to obey the signal of policemen who are directing the movement of such traffic and they shall not cross before

(Continued on Page 561.)

Keeping "Friends with George"

(M. L. PULCHER, Vice President and General Manager Federal Motor Truck Company.)

THIS is not a story of the Brotherhood of Man, but rather of the equality of all highway travellers.

The highways are for everyone. On them no one is king. Every person meets every other person on the highway—upon a common ground—upon an equality of drivership.

The man in the big twin eight has no greater privileges upon the public highway than the man with the

twin two flivver, and if the latter wants to pass the big car he should have the chance if there is room.

Likewise, a big speedy car ought to have half of the road to pass the big heavily laden motor truck.

Even if charity does begin at home, it should be continued on the highways and byways, shouldn't it?

There is no logical reason why the automobile or truck should run down Courtesy and kill it.

IT IS human nature, perhaps, that he who drives a car or truck naturally blames the other fellow. We—you and I—cannot possibly make a mistake. It's always, "No, sir, it wasn't my fault. He should have stayed over on his own side. He bumped into me." That's the way you and I explain most of the accidents, isn't it? It is absolutely true that for every car we pass we also pass the buck for the blame.

Whenever we drive there are over 10,000,000 automobile and truck drivers on the road with us. We are all human, but we all have our equal rights, and we must keep friendly with the other drivers.

We might just as well sit up and realize that the number of drivers is increasing by the million every year. The roads aren't being widened fast enough to make it possible for us to have our former freedom and room. We must "give ground" a little more all the time as the traffic increases.

The law of the highway of the future will not be might, but right—because lives are in the balance. Hundreds of thousands of our children are being killed every year because of the selfishness of drivers.

We are all good natured at heart, but the crust over our exterior won't let us be charitable toward the other fellow—that is, if he is in an automobile or truck. Meet him face to face in a lobby or a hotel or in his home and he is a mighty good fellow, but on the highway—he is someone, or something entirely different.

Why should we say, "Let George move over and stay on his own side of the road and accidents won't happen." Let us see what this foolish stiffness of our backbone is doing. There are three main causes of accidents. They are:

1. **Foolish chances taken.** (By far overshadows all others in causing accidents.)

2. **Misjudging road distance or speed.**

3. **Mishaps to mechanism.**

One thing we passenger car drivers must remember is this—the truck has its place on the highway. It is part of our great commercial system and business would suffer tremendously without it. You would go without a good many things tomorrow if the motor truck ceased to exist.

The truck driver has his rights and they should be respected. He is human and just as likable a fellow as there is in the world, and he is on the job doing his work as he sees it, and, being busy, he is thinking about nothing else but getting his load delivered. If you and I were driving in his place, that is the thing we would be doing, too. We should always remember that, although the truck may be going slowly and may be taking up a lot of the road, its errand may be much more important than ours and its driver may be in just as big a hurry as we are.

Truck drivers should, on the other hand, remember that the highways were not built entirely for commercial use and that there are nine times as many passenger cars on the road as there are trucks, and that

the errands they are on are not all frivolous. Doctors, commercial travellers, heads of business and many others are constantly using the roads for business purposes as important as those of the trucks. Big deals may be pending, or lives may be at stake, and these passenger cars must go on with the least possible delay. The truck driver should remember that slow moving traffic should keep to the right, should not blunder into congested traffic at right angles, and that at highway intersections road courtesy should be at its best.

Drivers of every kind of vehicle should keep friends with every driver. Not only does present day traffic demand it, but common sense requires it. One smile does more to make highway friendships than a thousand words. With a smile you can go anywhere on the highways. It is the good will of your fellow travellers that you and I must cultivate to make satisfactory progress.

Let's go into such a frame of mind that we will not expect all of the other people to get off the highways and give us the road in passing. I have been just as unreasonable as you. We have both been "It." Let's give a thought to road courtesy and see how many friends we can make.

Let's keep friends with George.

RENICK & PYLE TAKE LOMAR AGENCY.

MIDDLETON, O., Oct. 9.—Lomar shock absorbers, manufactured by the Lomar Manufacturing Company, will be distributed in the Cleveland territory by W. M. Renick and Blair Pyle.

Progress of Uniform Cost Accounting

IMMEDIATE results must not be expected from a campaign for uniform cost methods, states a bulletin from the Chamber of Commerce of the United States. There is a considerable period necessary for cost education so that the interest of the manufacturers in a particular industry will be gradually aroused to the point where they will demand uniform cost accounting rather than to have it thrust upon them.

Cost accounting should not be considered an incidental and temporary service to the manufacturers of

an industry, but should be organized on a permanent and continuous basis. This may be done, first, by forming a cost association or department within the trade association where the cost accountants of the manufacturers may meet three or four times a year to discuss such improvements and changes as should be made in the standard cost system, or, a cost accountant may be employed by the secretary of the group who, in cooperation with the cost accounting committee, will promote such changes in the cost procedure as may be necessary from time to time.

THE services of an outside cost expert are valuable and will be necessary at some point in the development of the uniform cost system, but these services should not be relied upon solely. Rather should there be developed the cooperation of those within the industry who are best posted on the cost practises and manufacturing problems of the industry.

Before proceeding with the establishing of uniform methods of cost determination it is necessary definitely to have in mind the objective; in other words, what it is hoped to accomplish, whether the cost accounting is to be used as a basis (a) for establishing individually fair selling prices, or (b) for establishing departmental or commodity costs and profits, (c) for increasing indi-

vidual efficiency, or (d) all three.

Before attempting any widespread improvement of the cost accounting in an industry it will be necessary to ascertain the stage of development of cost accounting in the industry, whether it is in the job cost stage, the process stage, or in the standard cost stage.

Cost Accounting Self-Sustaining.

Cost accounting for an industry as far as possible should be placed on a self-sustaining basis. Customarily little appreciation is shown for service rendered without charge and those trade associations that have been most successful in their cost accounting work have organized the same on an independent self-sustaining basis.

It is important never to relax in the efforts to maintain the interest

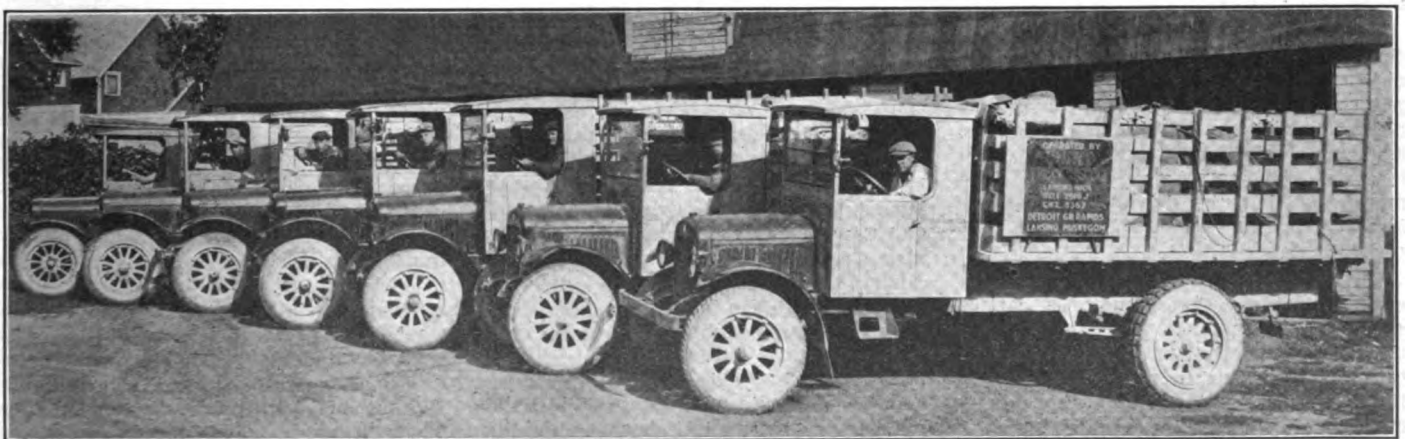
of manufacturers in cost work.

The fabricated production department is prepared to aid groups working upon uniform cost accounting by giving:

- a. Information of what trade groups are doing along this line.
- b. Advantages to be secured from uniform cost accounting.
- c. Testimonials from executives who are operating under uniform cost methods.
- d. Ways and means to arouse interest of executives in uniform cost accounting.
- e. Methods to be adopted to insure installation of the uniform cost system once formulated.

Where the situation demands and warrants it the fabricated production department is prepared to render even more direct assistance.

Ruggles Interurban Night Fleet in Michigan



The United Truck Company, Lansing, Mich., has established a fleet of seven Ruggles Model 40 trucks for use between Muskegon and Detroit. The trucks are in constant operation seven nights a week with no idle interval for tuning up and overhauling, yet not one of them has been out of commission for a single night.

The trucks are used on a fast schedule, making only two stops, Grand Rapids and Lansing, on the run between Muskegon and Detroit. This fleet through its record for low upkeep and operating expense is said to have strengthened the Ruggles position as "the new system of transportation economy."

Each of the trucks in this fleet is fitted with a stake body and Ruggles all-weather cab. Pneumatic tires are used all round. The special Ruggles engine and Ruggles rear axle are part of the equipment on these jobs.

LEGAL POINTS

By SAMUEL WANT

A CURIOUS case involving the construction of an automobile insurance policy was recently presented to the Supreme Court of Tennessee. In this case it appeared that the policy insured the automobile against loss by sinking, while being transported on any conveyance by land or water. When the machine was being ferried across a stream the ferry sank, carrying the car down with it. Shortly thereafter the car slid from the deck of the ferry and when thus relieved of the burden of the boat came to the surface. The car was afterwards recovered, though in a seriously damaged condition, and the insurance company denied liability on the ground that the boat had not sunk within the meaning of the policy. It was further argued that the ferry was not in a seaworthy condition, and that a warranty of seaworthiness should be implied as a condition of liability under the policy. The court rejected both of these contentions and sustained a verdict for the amount of the loss suffered by the motorist. In the law of marine insurance it is uniformly held that there is no liability on the part of the insurance company if the vessel insured by it was not in a seaworthy condition at the beginning of the voyage covered by the policy. The above mentioned case appears to be the first judicial ruling on the question of whether that principle is applicable to marine risks affecting the transportation of automobiles.

A NUMBER of recent cases deal with the application of state laws making it a penal offense for the driver of an automobile to leave the place of the accident without extending aid to the injured and leaving his name and address.

In emphasizing the reasonableness of these regulations against constitutional objections the Missouri Supreme Court points out—"The statute is a simple police regulation. It does not make the accident a crime. If a crime is involved it arises from some other statute. The mere fact that the driver discloses his identity is no evidence of guilt, but rather of innocence."

On that basis of reasoning the Maine court points out that a motorist cannot excuse noncompliance with the law on the ground that the accident was not due to his fault. But to render a motorist liable to prosecution under the law it must be shown that he actually knew or must have known that an accident occurred. In a recent case on this point it is held by the court that it is not enough to show that the motorist had means of knowledge of the accident available to him, even though he neglected them.

But as held in a New York case, if a collision occurs, from which any reasonable man might infer that damage or injury had resulted to another person, the act of the motorist in driving away with the assumed assurance that no harm had been done does not take the case out of the condemnation and penal provisions of the law.

IT IS unlawful to race motor vehicles on the public highways, and all persons engaging in such a contest, though driving in separate cars, are jointly liable for the act of any one of them in injuring a person in the street. This was recently decided in a Minnesota case.

IN A California case two cars collided. One contained only the driver and the other five people. The driver of the latter car was injured and demanded (as provided by the statute in the state named) that the other driver take him to a hospital. This demand was refused. The recalcitrant driver was then arrested. He was convicted in the lower court but on appeal this conviction was reversed. The higher court held that the law must be reasonably construed, and that it would be insensible to relieve the four companions of the injured man from all moral responsibility for his care solely to impose a technical criminal responsibility on the lone driver of the other car.

A CONSIDERABLE number of recent accident cases involve the question whether a motorist whose car or person is injured is deprived of a right to damages because of his failure to have the required license to operate his vehicle. The decisions of the several states are in direct conflict, with a majority of states holding that such a violation of the motor laws does not deprive the motorist of his right to damages, though of course he may be prosecuted for not having the license. Contrary rulings, however, have been made in Florida, Illinois, Kentucky, Missouri, North Carolina, Pennsylvania and Canada. In these states the rule denies a remedy to the motorist for all ordinary accidents, but does not apply to cases in which the injury was due to conduct that can be characterized as reckless, wanton or willful.

On the other side of this question—whether an unlicensed motorist is liable for an accident solely because of this violation of the registration laws, and without reference to whose fault the accident was due—the courts are generally agreed that no liability exists. Massachusetts is the outstanding exception in respect to this rule. There the law is well settled that the owner of an unregistered

car is liable for every accident in which his car figures, regardless of his negligence. This rule would not subject such an owner to damages, however, if the unregistered car were used without his consent.

IN A RECENT Missouri case a boy stepped into the roadway to pass around obstructions unlawfully placed in the street by a contractor. He was immediately struck by an automobile and killed. The autoist was impecunious, and a suit for damages was brought against the city and the contractor. It was held that both were liable for the boy's death, although the driver of the automobile had been guilty of negligence. Rulings of a contrary purport have been made in Iowa and New York.

IT HAD been supposed, until recently, that no principle of law had been more clearly and definitely established than the one that a motorist is not liable for an accident due to the negligence of his employee while driving the car without the knowledge or consent of his employer, and for some personal purpose. Decisions to that effect had been rendered by the courts of the most conservative and also of the most radical states in the country. Now, however, comes a decision of the Supreme Court of Florida which is directly in the teeth of this supposedly settled rule of law.

THE Florida court takes the broad stand that an automobile is a dangerous instrumentality, because of the inherent possibilities of injury to others in its operation. Therefore, the court reasons, sound public policy exacts of the owner the utmost diligence in the selection of careful and competent drivers, and to insure the exercise of such diligence, plus continued supervision, it is necessary to hold the owner legally responsible for every accident which is due to the negligent management of the car by any person regularly employed (though not authorized on the occasion of the accident) to operate it.

This (judicially) revolutionary doctrine would not, presumably, render the owner liable under the criminal law for infractions committed by his employees without his knowledge or consent nor would it apply to a case in which an employee, after business hours, stole the car from his employer's premises for some temporary personal purpose.

If you are in doubt about any legal points relating to automobiles, write to the Automobile Editor.

A DECISION of vital importance to manufacturers of automobiles, and tending to the greater security of the individual automobile purchaser, has been handed down by the New York Court of Appeals. In this case it appears that a comparatively new automobile collapsed as a result of the crumbling of one of the wheels. The owner was injured and he sued the manufacturer of the car for damages. It was proved that the latter did not manufacture the wheels attached to its cars, but bought them from a supposedly reliable and responsible concern that specialized on wheels alone. The defendant, having full and justifiable confidence in the maker of the wheels, did not test the wheels attached to its cars. It was admitted that if in this instance it had made such a test the defect in the particular wheel would have been discovered before the delivery of the car to the purchaser.

Two defenses were offered by the manufacturer of the car: (1) The car was sold by it to a dealer, and the injured owner had bought from the dealer, not from the manufacturer. The latter contended that its responsibility, if any, was to the dealer alone, and that there was no contractual relation between it and the ultimate purchaser. (2) The manufacturer also contended that liability for defective wheels rested only on the maker of the wheels, since the former had nothing to do with their manufacture and did not guarantee them.

The court rejected both of these contentions and held the manufacturer of the car liable for the purchaser's injuries.

In passing judgment the court said: "We think the defendant was not absolved from a duty of inspection because it bought the wheels from a responsible manufacturer. It was not merely a dealer in automobiles. It was a manufacturer of automobiles. It was responsible for the finished product. It was not at liberty to put the finished product on the market without subjecting the component parts to ordinary and simple tests. The obligation to inspect must vary with the nature of the thing to be inspected. The more probable the danger the greater the need of caution."

There was a strong dissenting opinion in this case.

Upon an exactly similar state of facts a contrary conclusion was recently announced by the United States Circuit Court of Appeals. This, too, was a New York case. There was a dissenting opinion in this case also.

As the two courts are supreme in their respective jurisdictions, the decision of such a case in New York will always depend upon whether the case is tried in the State Court or in the United States Court.

IN EVERY state and in the Canadian provinces there is a statute known as the "Sales in Bulk Act." It provides, in substance, that as against existing creditors of the seller, no sale of the assets of a business shall be valid unless certain formalities are complied with. Usually these are that notice of

the intended sale must first be given to all of the creditors of the seller, and that if the seller claims that there are no creditors he must execute an affidavit to that effect. A certain time—usually about 10 days—must elapse between the receipt of the notice by the creditors and the date when the sale is to be consummated. The object of the law, of course, is to protect creditors against clandestine sales that have for their object the stripping of the debtor of all tangible assets which the creditors can reach for the enforcement of their claims.

If these legal requirements are not complied with the creditors of the seller have the same rights to enforce their claims against the goods or property in question, in the hands of the purchaser, that they would have had if the sale had not taken place. And of course in such a case the buyer cannot escape the loss by claiming that he did not know of the law in question, or was led to ignore the legal requirements because of representations made by or misplaced confidence in the seller.

The "Sales in Bulk Act" has been recently applied in a number of cases involving sales of garages and accessory shops. Judgments against unwary purchasers who failed to comply with the law were rendered for substantial amounts. A prudent purchaser will therefore do well to seek legal aid before consummating a purchase. No amount of faith in the seller or general knowledge of his affairs should be made a substitute for strict adherence to the legal requirements.

Of course there are limitations to the "Sales in Bulk Act." For example, in an Arkansas case just decided the sellers were engaged in an accessory business. They sold their location to an automobile firm and out of their accessory stock worth about \$1500 they sold the latter various items aggregating \$154.91. It was decided that this transaction did not come within the bulk sales law. The court said that the law in question was never intended to impose restrictions upon a merchant who in moving his place of business sold his location with odds and ends or remnants of his stock. "In order to constitute a bulk sale it must appear that a material portion of the stock was sold in bulk out of the ordinary course of trade and contrary to the regular prosecution of the business of the seller."

IN A recent case it appears that the rates of insurance were larger, according to the age of the model of the car, and the insured represented in his application that his car was a 1910 model, whereas, after an accident, it developed that the car was a 1907 model. Of course the matter might have been adjusted by deducting from the claim the difference in the amount of premium for the older model, as compared with the premium actually paid, but the court applied strictly the rule that a material misrepresentative in the application, affecting the judgment of the company as to the amount of the premium or the advisability of taking the risk (which the

representation in question was declared to be), rendered the policy absolutely void.

It may be said generally that any misstatement in the application which influences the insurer in determining whether he would issue the policy or which guided him in fixing the amount of the premium will render the policy absolutely void. This is a general principle of law not dependent upon any provision in the policy to that effect.

Misstatements that are not of a material nature, within the rule given above, may also invalidate automobile insurance, if there is a provision in the application that all answers to questions therein shall be taken to be warranties. This renders it exceedingly important that the applicant for insurance use extreme care in making his application, for the willingness of some insurance companies to take advantage of purely technical defenses is notorious and has worked grave injustice in many a case.

Another point of importance relates to the condition of the owner's title. The policy is issued upon the theory of absolute ownership, free from many encumbrances. If there is a chattel mortgage on the car, or if it is subject to any other form of encumbrance, such as where it is sold under a conditional installment contract, this would render the policy entirely nugatory unless a proper indorsement of the fact is made in the body of the policy.

A CURIOUS case occurred recently in which it appeared that for some inexplicable reason an insurance agent, who was applied to for a policy upon an automobile, placed the insurance with an ordinary fire insurance company, and the company added to the usual form of fire policy a rider protecting the owner against loss from either fire or accident. After a loss occurred, resulting from both accident and fire, it developed that the insurance company had no authority, under its charter, to insure property other than buildings or other structures attached to real estate, and the company set this up as a defense to a suit on the policy. The court held that the restrictions in the company's charter are binding upon all persons dealing with it, and that no recovery could be had on the policy.

A RECENT Maryland case creates a suggestion that the dray horse, finding himself supplanted by the motor truck, is disposed to take a fling at his successor if not kept under proper restraint. In this case a horse was left untied and ran away. A motor truck was in his path and he dragged the wagon into it. The owner of the truck sued the owner of the horse and the latter proved that prudent management of the truck would have avoided the collision—in other words, he insisted that in a battle of wits between a truck driver and an enraged or frightened horse the former should win or take the consequences. But the court took a contrary view, holding in effect that though the horse may win in such a contest his owner must lose.

The Railroad Situation*

(By SAMUEL O. DUNN.)

BY LONG odds the most outstanding feature of the present railway situation is the inability of the railroads to move the freight being offered to them.

The farmers cannot ship the crops they already have harvested, and the wheat has not all been threshed and the corn is not yet gathered.

Every single industry in the country is reporting that its shipments, and many that their production, are being restricted by lack of transportation.

I WISH I could assure you that this situation is due to temporary conditions and that it will soon be improved. I cannot do so. The coal strike has created an abnormal demand for the transportation of coal. The railway shop employees' strike has left all the railroads somewhat crippled and some badly crippled. These things have made the shortage of transportation greater than it otherwise would have been, and their effects cannot soon be removed.

Strikes Aggravate Situation.

But the fact is that although the coal strike and the shop employees' strike have aggravated the present transportation situation, they have not created it. It is mainly due to two series of developments. The first of these is the very large increase within recent months in industrial and commercial activity and, in consequence, in the freight offered to the railroads for movement. The second is the long decline which has occurred in the expansion of the railroads. If all the locomotives and cars now owned by the railroads were in normal condition, they could not handle anywhere near all the freight that is being offered to them, and which, in the months ahead, will be offered.

Business Rapidly Increasing.

Everybody knows that, with occasional setbacks, the production and commerce of the United States always have rapidly increased. Too few have paused to consider that every increase of production and commerce causes a corresponding increase in the demand for railroad transportation, and that unless the capacity of the railroads increases in proportion to the productive capacity of our farms and industries the effect must be to limit production and commerce of all kinds. At a time when most people are rejoicing because general business activity is reviving, it is not pleasant to be obliged to express the opinion, which, however, I do express, that because of lack of transportation there will not be, and cannot be, any such increases of production and commerce in this country in the months and years immediately ahead of us as there have been during corresponding periods of business revival in the past.

There is no better measure of the increase which has occurred in any period in the volume of production and com-

merce than the increase in the volume of freight shipped in that period. In the 10 years ending with 1907 the increase in railway freight business in this country averaged 14,000,000,000 tons carried one mile annually. In the next 10-year period, that ending in 1917, the increase in freight business averaged almost 16,000,000,000 tons carried one mile annually. The average increase per year in the 20 years from 1897 to 1917 was almost exactly 15,000,000,000 tons carried one mile.

In the latter part of that 20 years the railroads had greater and greater difficulties in handling the normal increase in their business. Congestions and so-called shortages of cars ceased to be merely occasional and sporadic and became chronic.

Railway Management Fails to Move Freight.

In order to increase the business handled the government assumed operation of the railroads at the beginning of 1918. In spite of all the efforts made under government operation, it was found impossible to increase the freight moved in 1918 more than two-thirds as much as what had previously been a normal increase. In 1920, with the railroads again under private operation, the managements exhausted their utmost resources in efforts to handle all the business offered. They again increased the freight moved, but they failed by a substantial margin to move all that was offered. The average increase in the amount of freight moved annually in the three years ending with 1920 was only 5,000,000,000 tons carried one mile, or only one-third of what had been the normal annual increase during the preceding 20 years.

Freight Business Again Large.

Now we have a large freight business offered again. What is happening? The railroads are putting forth the utmost efforts to move it and they are not yet quite equalling the record made in 1920. In due time, if the conditions remain reasonably favorable, they will equal and surpass that record. But consider what these facts mean. Never prior to 1917 did the railroads, when business was large, fail to move an amount of freight which substantially exceeded all previous records. Now they are finding it extremely difficult to equal the record of 1920, although in the three years ending with that year they increased the traffic handled only one-third as much per year as they had previously increased it for 20 years.

To what is this situation due? Statistics are always tiresome and often confusing, but I must give you some to show what has happened. Probably you have seen statistics showing that year by year for the last 20 years the number of new locomotives and cars put into service has rapidly declined. It has sometimes been answered that the new locomotives and cars have been more powerful and larger than the old ones, and that therefore this decline in the number of new ones acquired does not show a corresponding decline in the expansion of the capacity of the railroads. Let us then use statistics regarding the increase in the total tractive power of locomotives and the total capacity of cars. In the five years ending with 1907 the average annual increase in tractive power of all the locomotives in service was 128,000,000 pounds. In the seven years ending with 1914 the average annual increase was less than 75,000,000 pounds. In the seven years ending with 1921 it was only 63,000,000 pounds. In the year 1921 it was less than 39,000,000 pounds.

Now, take the capacity of freight cars. The average annual increase in the total capacity of all the freight cars in the country in the five years ending with 1907 was 5,000,000 tons. In the seven years ending with 1914 it was less than 3,500,000 tons. In the seven years ending with 1921 it was only 1,000,000 tons. In 1921 it was only 500,000 tons.

These figures indicate clearly how increases in the power of locomotives and capacity of cars have declined until they have almost ceased. The development of the other facilities of the railroads has declined in equal proportion. The increase in the total tractive power of locomotives was less than one-half as great in the seven years ending with 1921 as in the seven years ending with 1907. The increase in the total capacity of freight cars was only one-fifth as great in the seven years ending with 1921 as in the seven years ending with 1907. No man in his senses can expect the railroads, in view of these facts, to deal successfully with anywhere near as large an increase in freight as they easily dealt with when business revived after the panics of 1893 and 1907, and after the depression of 1914 and 1915.

Present Situation Limits Commerce.

It was long predicted by those who opposed the policy of restrictive railway regulation that in time it would result in making railroad transportation the limiting factor in production and commerce in this country. That prediction.

*Address delivered by Samuel O. Dunn, editor of *Railway Age*, before annual meeting of Associated Business Papers at New York City, Oct. 12, 1922.

unfortunately for everybody, has now been completely fulfilled. Almost every other condition is favorable to an increase of production and a revival of prosperity such as we had after the panic of 1893, after the panic of 1907 and after the depression of 1914 and 1915. The railroad situation makes impossible for the present any such increases of production and commerce as occurred then.

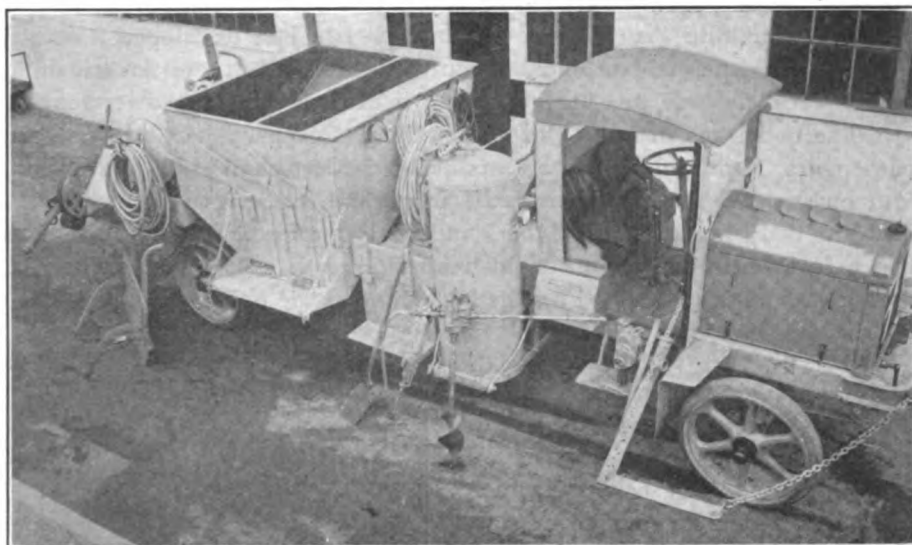
This limitation upon the country's prosperity and development must be removed. How can this be done? The answer is simple and obvious. The influences which have reduced and almost stopped the expansion of the railroads must be removed. Much the greater part, or all of this reduction of the expansion of the railroads has been due to the policy of government regulation, which has greatly reduced and narrowly restricted the net return earned by them. This reduction and restriction of their net return has driven new capital from them.

Unable to raise new capital in relatively as large amounts as in former years, they have been unable to develop and increase the capacity of their properties as formerly. Under the transportation act they were assured in 1921 a net return of six per cent. Business fell off, expenses were high and they earned and received only 3.3 per cent. Under a ruling of the Interstate Commerce Commission it is now held that they are entitled to earn 5% per cent. Thus far in 1922 they have earned $4\frac{1}{3}$ per cent. They never can raise enough new capital adequately to develop their facilities until they earn a much larger net return. With the large increase in business that is now occurring and the shop employees' strike behind them, they probably can soon begin to earn the 5% per cent. to which the commission says they are entitled. But how long will it be after they begin to earn it until there will be another widespread demand for general reductions of freight rates?

The public long has been told that the railroad problem of this country was ceasing to be one of rates, and was becoming one of lack of transportation. The public, however, has insisted in regarding the problem as chiefly one of rates and in consequence cannot now get, and for a long time will be unable to get, anywhere near enough transportation. It will lose many times more in a short period by this lack of transportation than it has gained in the last 10 years by keeping rates on a basis which has almost stopped railroad development.

Do not in this crisis denounce the managements of the railroads. The farmers and business men and the regulating authorities who have done what the farmers and business men have demanded are the people who are responsible. There is no immediate remedy for the present transportation situation. It must be borne as best it can. It can be remedied in time by the adoption of a wiser and fairer policy which will let the railways earn the net returns they require in order to furnish adequate service. There is no other remedy under private ownership and very few business men wish to take a chance with government ownership.

Highway Truck Completely Equipped



A Remarkable Highway Maintenance Truck Has Recently Been Built by the Fageol Motors Company for the Board of Supervisors of Kern County of California. Truck is illustrated in the accompanying photo. Mr. Stanley Able, Chairman of the Board of Supervisors of Kern County, was partly responsible for the development of this idea. The equipment has proven such a remarkable success that it will be manufactured by the Fageol people for other counties, also cities and states use.

Truck Popularity Grows

THE motor truck is yearly proving more popular as a means of transportation for freight in all sections of the country, according to Vance Day, sales manager of the General Motors Truck Company of Pontiac, Mich., who gives production figures from 1904 to 1922 to prove his contention.

There is little doubt, Mr. Day says, that the truck will continue to assume a greater share of the freight business of the country for the next generation and if the business increases as rapidly in the next 10 years as it has in the past there will be need for special roads to take care of the traffic. He believes that the time is coming when every state highway will be built in two sections, one for trucks and slow moving vehicles and the other for passenger automobiles that travel at a much higher rate of speed.

In Massachusetts this system is already followed in many sections and some other eastern states are beginning to adopt the same system.

Mr. Day points out that in 1904 there were only 411 trucks made in this country, but in 1922 the total

production will probably be more than 200,000. In a period of five years, in 1909, the trucks made in the United States had taken a decided jump and Mr. Day's figures show that they numbered 3255 in this year. In 1914 another tremendous increase was noted with production set at 25,375.

The first year that the industry passed the six figure mark was in 1917, when 128,157 trucks were made; in 1918, 227,250. In 1919 production jumped to 316,364 and in 1920 the highest mark in the industry was reached, with a total of 322,039. In 1921 the production slumped off and 154,550 trucks were made, but with the revival of business early this year the General Motors Truck Company production was increased and Mr. Day says the chances are that the 200,000 mark will be passed this year with good prospects of approaching the 1920 record in 1923.

It is felt that the railroad situation, aggravated by the recent strikes, is such as almost to guarantee a large increase in the use of trucks and there is no doubt but that truck sales will show much activity.

Republic Interurban Bus Embodies New Design

THE Republic Truck Sales Corporation has just developed a new type of interurban bus for operation on long concrete bus lines, which was exhibited at the American Electric Railway Association Convention recently held in Chicago, where it attracted marked attention.

The body was built by the Bender Body Company of Cleveland, and is of the stream line type and seats 19 passengers, 10 on double cross seats along the left-hand side, five on single seats along the right-hand side and four on the rear seat, which extends across the full length of the body.

The body is mounted on the standard Republic Knight Motored Bus chassis and has 175-inch wheelbase. It has a front entrance on the right-hand side with a 25-inch clearway, a two-panel folding door that is operated by a nickel push rod, which can be locked when the door is closed. The door folds outward.

THE floor level is 26 inches. There is one step, which is covered with corrugated rubber to prevent slipping. The side posts are spaced on 40-inch centers, which provide wide and airy window space. The window glass is heavy plate and operated by a crank as in modern limousine body construction. Each window can be operated at the will of the passenger. The interior finish is mahogany below the window sill and the ceiling is finished in brown leather.

The lighting arrangement consists of eight dome lights spaced equally three on a side with one in the center in line with the front and rear side posts. In each dome are two four-candle power lamps surrounded by frosted glass cages.

The seats are of the cross-legged type and are built by the Bender Body Company. They are substantially upholstered in leather and are of sufficient width, 36 inches, so that two people can sit comfortably without interference. Aluminum seat handles are mounted on the aisle corner of each seat to provide means of keeping one's equilibrium when the bus is traveling. The seat cushions are 17½ inches in width and the backs are 22 inches high. Seats are spaced on 30-inch centers. The single side seats are 19 inches in width and have the same dimensions as the two-passenger cross seats. The width of the aisle is 17 inches.

In each window is a maroon silk curtain on spring rollers and are cord strung so as to keep them from swaying. The floor has first a linoleum covering over which is placed a carpet that comes in sections and which is fastened down by means of clips. This allows the carpet cover-



"The Epitome of Class" Might Well Be Said of This Fine Republic Job.

ing to be removed at frequent intervals for cleaning purposes.

Other accessories that go to make for convenience of the passengers and the operator are Faraday buzzers in each post, coat hooks at each post, step light and ventilators in the arched roof. The inside width of the body at the top of the seat cushion is 72 inches, and the 72-inch head room provides ample space for the average passenger to walk up and down the aisle.

For the convenience of the operator all controls for lights and ignition are mounted on the dash. He also has a leather curtain that he can pull down behind his bucket seat to shield the light rays that reflect from the glass windshield when the bus is operated at night. He also has an adjustable windshield which can be controlled from the inside, a black sun visor and a cowl ventilator which is operated by a handle on the dash. There is also a Foberth automatic windshield cleaner and a 24 by six mirror to enable the operator to get a view of the interior.

The body is mounted on pneumatic tires 34 by five, with duals in

the rear. Budd-Michelin wheels are used throughout. A spare tire all mounted on a disc wheel is carried under the rear of the body back of the rear axle in an inclosed compartment. The bus is equipped with Stewart double type bumpers both front and rear, which add to the appearance of the job.

An intake port for gasoline is located on the right side of the bus, outside, making easy work of the detail of taking on fuel.

Some of the principal dimensions are as follows: Length over-all, 280 inches; length exclusive of bumpers, that is from the tip of the frame to the rear of the body, 222 inches, and the length from the tip of the radiator to the end of the body is 266 inches. The length of the body inside is 210 inches and 224 inches on the outside. The outside width is 78 inches. All told the vehicle weighs 8500 pounds complete without passengers.

There is also a rear emergency door which is 35 inches wide and takes in half of the rear end. A stop light is also mounted on the rear and connected to the clutch pedal in the approved manner.

Model J-2 Latest Product of Bessemer Company

THE Bessemer Motor Truck Company of Grove City, Pa., manufacturer of a complete line of commercial vehicles, has recently announced its 2½-3-ton truck, known as model "J-2." This vehicle, equipped with tandem duplex drive rear axle and electric lights all ready is meeting with the approval of the trade and the company feels justified in looking forward to a wide distribution of this particular model.

Specialized parts play a most important part in the design of the truck, the Red Seal Continental en-

gine, Brown Lipe transmission, Pierce governor, Borg & Beck clutch and units manufactured by other high grade concerns being used.

The complete specifications are as follows:

Motor—Red Seal Continental; four-cylinder; 4½-inch bore, 5¼-inch stroke; three-point suspension.

Lubrication—Constant level oiling system; splash and force feed by plunger pump; sight feed on dash.

Ignition and Generator—Eisemann combination high-tension magneto and six-volt generator in connection with heavy duty battery.

Carburetor—Stromberg.

Cooling System—Circulation by positive centrifugal pump.

Radiator—Bessemer, armored type; cellular core; protected by radiator guards.

Transmission—Brown-Lipe, selective

sliding gear type; four speeds forward, one reverse; mounted amidship; nickel steel gears; Timken bearings.

Governor—Pierce; centrifugal type.

Clutch—Borg & Beck dry plate; adjusting studs on outside of clutch housing for taking up wear.

Front Axle—Drop forged; I-beam; nickel steel spindles; Timken bearings.

Rear Axle—L M tandem duplex drive. All gears run in oil.

Steering Gear—Irreversible type, only one adjustment; spark and throttle hand controls; foot accelerator.

Gear Shift—Right hand; center control.

Frame—Pressed steel, reenforced with special gusset plates and cross members; front end with built-in bumper block. Depth, six inches; flange, 3¼ inches; thickness, ¼ inch.

Springs—Two main leaves chrome vanadium steel. Front, 2½ inches by 40 inches long; 10 leaves. Rear, three inches by 56 inches long; 12 leaves. All spring pins case hardened and ground to size.

Brakes—Service, 18 by 2¼ inches internal expanding. Emergency, 18 by 2¼ inches internal expanding, on rear drums.

Wheelbase—Standard, 158 inches. Special, 176 inches.

Wheels—Wood; artillery type. Steel wheels, if desired, extra.

Tires—36x4 front; 36x4 dual, or 36x8 giant rear; optional, solids.

Dash—Pressed steel.

Weight of Chassis—4800 pounds.

Loading Space—Length of frame behind driver's seat, 141 inches; width of frame, 34 inches.

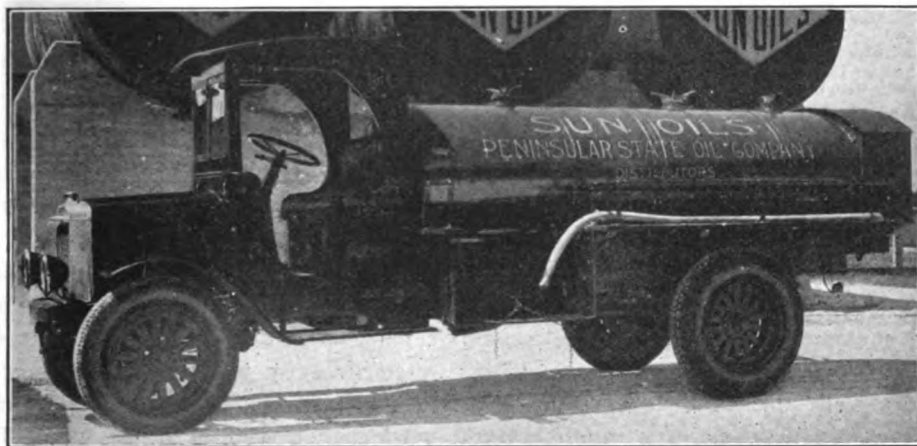
Radius Rods—Provide direct connection between driving axle and frame, acting on swivel, giving perfect alignment.

Tread—Front, 56 inches. Rear, 63½ inches.

Gasoline Tank—Under seat; 20 gallon capacity.

Standard Equipment—Driver's seat; tool kit; tool box; electric horn; jack; two large electric head lights; tail light; dash pilot light and ammeter.

Finish—Painted, striped and varnished.



A Tandem Duplex Drive Rear Axle Is a Feature of This Bessemer Truck.

New Selden-Atlas Branch

THE excellent building and facilities of the Hartnett-Stewart Motor Company, 1819-21 South State street, Chicago, Ill., have been taken over by the Selden Truck Corporation, Rochester, N. Y., and will be operated as a direct factory branch. The branch will be known as the Selden Sales and Service Company, with James W. Stewart as branch manager.

The Hartnett-Stewart Company has represented the Selden Truck Corporation in Chicago since the first of the year. The Selden Sales & Service Company will be a combination of the Atlas Truck Corporation and the Selden Truck Corporation. J. Ira Hartnett will remain as Selden sales manager and Randall H. Crouse will be the Atlas

sales manager.

At Philadelphia, Pa., the Atlas Truck Corporation branch has been united with the Selden branch to operate as the Selden Sales and Service Company, handling both Atlas and Selden trucks. George H. Covert will remain as branch manager in charge of Selden sales. H. A. Woodruff will continue in charge of Atlas sales.

At York, Pa., the home of the Atlas truck, another branch operated as the Selden-Atlas Sales and Service Company has been opened at 127 South Duke street, with H. M. Heiges as manager. Mr. Heiges has been in charge of Atlas sales at York and a proved success at this point.

The Industrial Motors Corpora-

tion, of which both the Selden Corporation and Atlas Corporation are divisions, has given the sales of Atlas trucks to the Selden organization with H. T. Boulden as sales director. It is thought that this policy of combined branches will be carried out in practically all the larger cities. The branch will then sell and service both the Atlas speed trucks and the Selden medium and heavy duty line, all from the same agency.

At the present time nine branches are in operation. The branches operating as Selden Sales and Service Company are now at New York City, New Haven, Conn.; Philadelphia, Pa.; Cleveland, O.; Charlotte, N. C.; Chicago, Ill., and Tulsa, Okla. The branch at Atlanta, Ga., operates as the Selden Service Com-

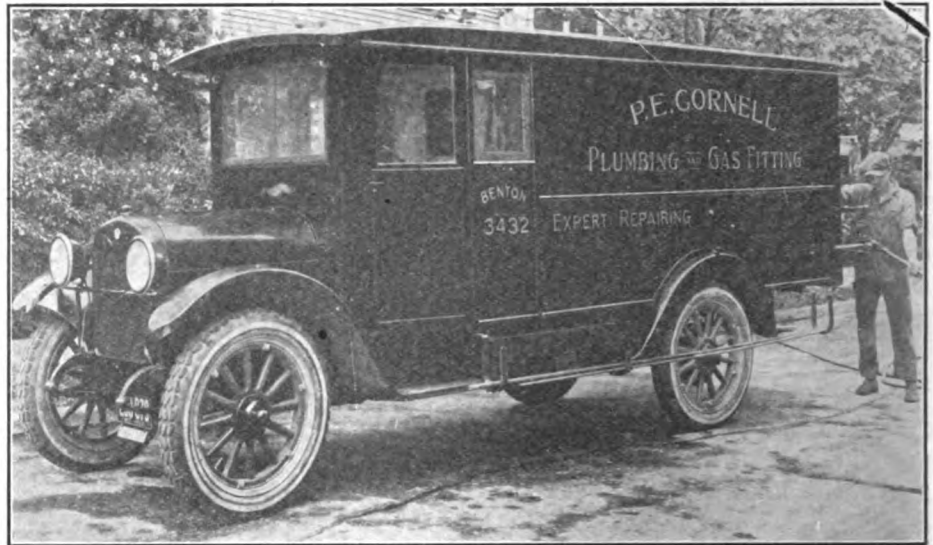
Here's Real Progress

NO LONGER will it be necessary for the plumber to "go back after his tools," that is if all of these artificers adopt the plan of P. E. Cornell, a Kansas City business man, who has transferred his entire plumbing shop to a special body mounted on a Reo Speed Wagon chassis.

Mr. Cornell's idea, which is work-



The Rear of This "Plumbing Shop on Wheels" Makes a Fine Work Bench. The Interior Offers Ample Room for Storage of Supplies and Material. The Body, States the Manufacturer, Though Specially Built for Mr. Cornell, Was Very Reasonable in Price and Exceptionally Efficient.



Seems Too Bad That This Plumber's Plan Cannot Universally Be Adopted. It Would Save the Householder a Lot of Money and Might in Time Even Do Away with the Old Joke About "Going Back After Tools!" Probably Wouldn't Though.

ing out very nicely, was to give the people whom he served the advantage of his service without wasting time in going back and forth to the shop for material which, of course, is always charged up to the customer and that the public welcomes any such innovation has been conclusively demonstrated. Not only does Mr. Cornell give much better service by his mobile plumbing

shop, but it is service given at cheaper rates and makes more money for the plumber than as though he had a shop to contend with. Mr. Cornell claims he can go a week without returning to his storehouse for replacements. The interior of the Speed Wagon plumbing shop is arranged with shelving, drawers and a work bench and is fitted with all the modern devices and tools needed.

SERVICE.

(Continued from Page 527.)

than is accorded the average passenger car—but the number is relatively few as the fair minded observer must admit.

The motor truck service station should have mechanics ready at all times to attend to servicing any truck that may be brought in for repairs and its schedule of working hours should be limitless. We recall one service station operated as a factory branch to which the operator of an ice company had occasion to send one of his heavy duty trucks during the summer just passed. This truck in coming from the ice house suffered a badly strained axle and the owner, who needed it every working hour of the day and sometimes far into the night during the rush season, feared that it might be laid up until an axle could be ob-

tained from the factory. Imagine his surprise, however, when in conversation with the service station over the telephone he was informed that the repair would take not more than four hours and that the truck would be ready for the driver at any time after 5 o'clock the following morning. To say that he was delighted would hardly express the fact. He has purchased several other trucks of this same make within the last two months, which shows in what esteem he holds the manufacturer, just as it also shows why there is need, from a sales viewpoint, for proper servicing of the commercial vehicle.

Here's another case in point which is somewhat different unfortunately. It has to do with an operator who uses five heavy trucks. Most of this man's work is done by contract with certain mills and consists of carry-

ing supplies inland from tidewater. Many of these mills are owned by the same company and practically all supplies are bought at once, being distributed to the different mills from a central station. During the last two months these trucks have been engaged in carrying coal, which, procured in many round about ways has been badly needed by the mills. It was while one of the larger trucks was engaged in handling a certain amount of this fuel that an accident occurred which necessitated immediate repair. The service station of the dealer who sold the truck was gotten in touch with and promise was made to have the vehicle running again inside of three days. The owner, to whom every moment meant money, demurred at what he rightly considered a waste of time, but to no avail;

(Continued on Page 576.)

Fifth Avenues of America

(By J. E. PENNYBACKER, Former Chief Economist, U. S. Bureau of Public Roads.)

FIFTH AVENUE, New York City, is more than the stateliest thoroughfare in the world's greatest city. It is in a sense an institution firmly established in the affectionate pride of Americans irrespective of their places of abode. I do not mean that Fifth avenue holds a unique place in the regard of our people, but rather that it takes rank with the other show places of America, which tend to make the American chest swell a little larger with each inventory of the outstanding features of his native land. As examples, I might mention Niagara Falls, Yellowstone Park and the Grand Canyon as God-given treasures, and, as among the wonders created by man, the Washington monument with its simple dignity, the immensity of achievement of the Panama Canal, the lofty sky line of New York and the historic interest of Pennsylvania avenue in Washington. To the American citizen comes a sensation of affectionate ownership much like that which the devotee of art experiences as he wanders through his own cherished collection.

I DO NOT mean to create the impression that Fifth avenue is the only great thoroughfare entitled to a place in this gallery of American masterpieces, I use the term rather in a representative sense. Washington has its historic Pennsylvania avenue, its 16th street, known as "The Avenue of the Presidents;" Chicago has its wonderful Michigan boulevard, and Philadelphia its far-reaching Broad street. In fact, most of our cities have their Fifth avenues by whatever name. If they have not they should have them. It is good to be a joint owner of something so tangible and beautiful and yet as democratic as a great and impressive street or highway.

Far out of sight and sound of the cities America is building a marvelous network of Fifth avenues, many of them having a pavement equal to that of Fifth avenue and some of them already famous throughout the length and breadth of the land. I do not mean to imply that they are counterparts of Fifth avenue, but in their own way they are equally impressive and equally entitled to admiration and affectionate regard. On the Pacific coast there is the wonderful scenic route known as the Columbia River Highway, surpassing in some respects the noted Alpine roads throughout Switzerland. Within the past few years there has been carved out of the rocky breast of Old Storm King Mountain on the Hudson river, a smooth highway destined to be a show place to the

thousands of tourists who visit New York. The governors of Pennsylvania and New York joined in the ceremony which opened the beautiful Lackawanna Trail, a superb stretch of highway 28 miles long, filling in the remaining gap between Binghamton and Scranton and traversing some of the most picturesque country in all of North America. Down in North Carolina on a great central highway from the mountains to the sea they are building hundreds of miles of pavements identical with those which sustain the ceaseless stream of Fifth avenue traffic—while stretching across the country from coast to coast like a 3500 miles ribbon is the Lincoln Highway, much of which is now in the progress of being transformed into modern pavements.

This vast road building programme involving an outlay of nearly a billion dollars annually is transforming the lonely byways into fascinating Fifth avenues with smooth, velvety pavements, dustless, noiseless and enduring.

The standard high-grade country road until a few years ago was the macadam pavement named after that practical English road builder, John Loudon Macadam, its inventor. His theory was that earth if compacted and kept dry would sustain any load. He designed a pavement made up of broken stone rolled so that the fragments interlocked, and filled the voids with smaller stone and rock dust. When this pavement was wet and thoroughly rolled the rock dust

and water formed a mortar and made, with the rock fragments, a crust which kept the earth subgrade dry and thereby sustained traffic. The steel tired vehicles and horse shoes wore just enough new dust from the rock constantly to renew this mortar, as portions of it were blown off the road in dry weather. With the coming of the automobile, however, a wholly new condition arose; the rubber tires did not wear off any new rock dust, but in their rapid movement lifted the rock dust from the road while cross currents of air carried it from the road to the abutting fields and gardens much to the disgust of the property owners and seriously to the damage of the pavement which, robbed of this essential binding material, ravelled and disintegrated.

The problem of the engineer, therefore, was to obtain a binding material which would be so powerfully adhesive as to resist the suction of the shear of the automobile wheel and which would render the road at once dustless and waterproof. Such a waterproof adhesive, known as asphalt, was already in use in the construction of pavements like that on Fifth avenue and on most of the principal streets in European and American cities. Asphalt is one of the many useful products of petroleum, that marvelous servant of man which ministers to so many human wants. It is a striking fact that petroleum yields not only the gasoline which drives the automobile and the lubricating oil which

reduces friction in operation, but it also provides asphalt for the pavement upon which the automobile moves. And it is a fact that asphalt in many cases is an ingredient of the paint on the car body and of the rubber in the tire. Finally asphalt is the essential constituent of two-thirds of the roofs constructed annually in the United States. Proof of the remarkable waterproofing and preservative value of asphalt was afforded a few years ago by the discovery in asphalt pits near Los Angeles of hundreds of complete skeletons of prehistoric animals, including the sabre tooth tiger and the mighty mastodon. Scientists estimated that these skeletons were not less than 2500 years old and might be 500,000 years old.

Some of the earlier city pavements were constructed of rock naturally impregnated with asphalt and later pavements were of asphalt mined from lakes or deposits left as a residue after evaporation of the lighter oils. Four-fifths of the asphalt now produced, however, comes from the great oil refineries where an asphalt of practically 100 per cent. purity and of any desired consistency can be obtained by removing the lighter constituents of the petroleum used. Sixty per cent. of our petroleum asphalt comes from Mexico and a considerable portion from California and Wyoming, as the Mexican, California and Wyoming oils are rich in asphalt base while most of the eastern and mid-continent oils have a greasy or paraffine base. We are therefore largely dependent upon Mexico for our excellent Fifth avenue pavements.

At first it was considered too costly to adapt the city pavements to country roads and so it was sought to utilize an oil containing asphalt in connection with the macadam highways. The asphaltic oil was therefore merely sprayed over the surface of the old macadam roads. While it at once rendered them dustless and to a large extent stopped disintegration, it was after all no more than a top dressing and all of the defects of the old road

were destined eventually to show through. This explains in a measure why a great many roads which seem to have an asphalt surface are defective when as a matter of fact they are merely the old worn out macadam roads carrying a top dressing of the asphaltic material.

A little later on the engineers in building the macadam roads incorporated asphalt into the pavement by pouring the hot melted material on to the layer of stone and allowing it to penetrate deeply enough into the pavement to coat each stone fragment. The result was a type known as asphalt macadam, of which New York state now has over 3500 miles, while New Jersey, Connecticut, Pennsylvania, Delaware, California, Oregon and other states have a few thousand miles more. We have become so accustomed to getting the best of everything regardless of cost that we sometimes lose sight of the magnitude of past achievements. Consider what it would mean to have the hundreds of thousands of automobiles churning up dust on the old style macadam road and realize that in this small group of states these 5000 miles of dustless, noiseless, waterproof roads have eliminated some at least of the old ills of travel. We can therefore be a great deal more lenient toward the defects which the inexperience of the earlier road builders and the shortage of funds made inevitable in the initial building of this type of road, for this was a pioneer type. The engineer had to develop a type by degrees in the face of a growth of motor traffic which was phenomenal. These old asphalt macadam roads have rendered excellent service over a period of time running back 12 or 14 years and have yielded a return several times their original cost.

Hardly had the engineer solved the problem of sustaining the fast moving, passenger motor traffic when the lumbering motor truck hove in sight. Here was a new problem, not that of speed, but of weight. The motor truck does not as a rule use pneumatic tires, but depends upon solid rubber or

cushion tires. Its weight runs all the way from the little one-half ton "tin Lizzie" to the ponderous juggernaut which, with its load, weighs 30,000 pounds or more. Recent tests at the United States Bureau of Public Roads brought out the rather startling fact that a loaded truck moving at a rate of 15 miles an hour delivers a blow to the pavement, if the wheel has a one-inch drop, equal to a weight six times as great as the weight of the load at rest.

For example, if there is a 7500-pound weight resting on one rear wheel and that rear wheel moving 15 miles an hour encounters an obstacle which causes it to drop one inch it may deliver a blow equivalent to a weight on that one wheel of 45,000 pounds. Manifestly these lightly built macadam roads, even though asphalt had wonderfully improved them, could not stand such a terrific bombardment and so the engineers turned their attention to solving the new problem of impact.

Two theories were advanced in designing a pavement to resist impact. One was to build with massive rigidity, thus opposing to the impact of the wheel sheer strength, and the other was to interpose some flexible material which would give resiliency to the pavement, yielding where yielding was necessary and standing when it had yielded to the point of having beneath it the entire supporting power of the foundation and the earth subgrade. The first school contended that the pavements must be constructed as a beam to take a maximum load just as a building or bridge would be designed.

The second school held that the comparison is not an apt one as the pavement in a sense must resist a bombardment or a series of impacts, while rigid structures must carry weight, but are not primarily designed to resist impact. Most city streets are constructed according to the second method or rather a combination of the two through the construction of a rigid Portland cement concrete base and a flexible asphalt top that, in a sense, serves as a shock absorber.

(Continued on Page 552.)

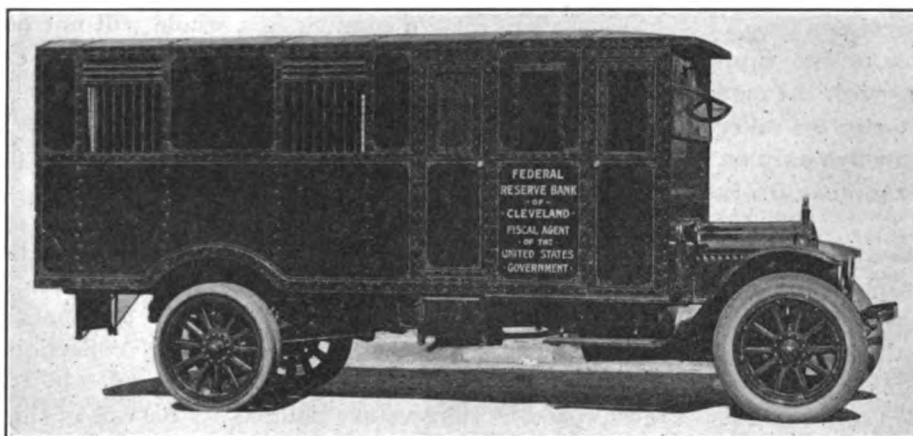
Armored Truck Foils "Payroll Gangs"

SPORADIC cases of lives lost and payrolls stolen in the ambush by bandits of armed, but nevertheless practically defenceless, messengers in a number of cities during recent weeks, have kindled a new interest in the lead taken in New York, Boston, Chicago, Philadelphia, Cincinnati and Cleveland by banks, public utilities and other companies having constant need to transfer money and other valuables.

The lead they have taken lies in the direction of greater security and enhanced service, less loss of life and money, in the transportation of large sums through the thoroughfares of congested cities.

Seeing an opportunity to give real service to industrial concerns, merchants and others by making a specialty of offering them safety and service in the transfer of payrolls and money, while protecting their own transactions by means of the same conveyance, more and more banks are purchasing armored motor trucks.

Success
Would Be
the One Thing That
Banditti (Whatever
That Means)
Would Have the
Least of



If They
Tried to Hold
Up This Armored
Truck Which
Daily
Transfers Big
Pay-Rolls.

TWO White trucks, with armored bodies, transfer thousands of dollars daily for two big banks in down town New York. One two-ton truck carries a body of quarter-inch steel. In addition to the driver, two guards generally man the truck on its trips. The guards, heavily armed, ride on the inside. The keys to the only door, which is in the side of the body, are held in the branch banks or in the possession of the guards riding inside the truck. In no case can the driver open the door. In event of the truck being fired upon the steel walls of the body are of sufficient strength to flatten ordinary lead bullets, while from their protected position in the interior of the "fortress," the guards can return the fire of bandits through "portholes" arranged for such an emergency.

"Auto Bank" in Philadelphia.

Day and night the "auto bank" owned by the Quaker City Cab Company of Philadelphia answers calls. Its chief responsibility is the safe collection of funds from theaters, tradesmen, fraternal orders, building and loan companies and other organizations which custom-

arily receive large sums of money after the closing hours of banks.

A small rear platform makes it possible to use the truck as a pay car. The truck is often used to carry payrolls to outlying sections.

The body of the "auto bank" is of bullet proof steel. Should the truck be attacked the cashier could, merely by touching a button, drop steel curtains over all windows. The windows are further protected by steel bars. The door has a double combination lock. Tampering with locks on either door or windows would set in operation a standard burglar alarm system, connected with a large gong in the roof of the truck. If accident should befall the driver the cashier could cut off the gasoline supply and stop the truck by pressing a button inside the body.

Mobile Pay-Off System.

In Chicago the surface lines carry the pay envelopes of their thousands of employees to car barns and other widely scattered pay-off places in a White truck, all windows in which are protected by iron bars and an alarm system. In some cases the truck merely carries paymasters and money from one car barn to another,

while in others it goes into the country to pay off linemen, trackmen and workers engaged in special construction. The Cincinnati (O.) Traction Company also depends upon a White two-ton truck for the safe transfer of payroll money to outlying car barns.

In the collection of money from its many telephone pay stations, the Bell Telephone Company of Philadelphia uses an armored truck. Other users of armored White trucks are the Federal reserve banks at Boston, Chicago and Cleveland, the Cleveland Trust Company, the Citizens Savings and Trust Company and the Garfield Savings Bank Company in Cleveland, the First National Bank and the National Shawmut Bank in Boston.

Briefly, the work which these trucks do is the same formerly done, only less efficiently, less promptly and with more danger to human life, by trusted messengers. They transport money between main banks and their branches, banks and railroad stations, postoffices and express offices; distribute payrolls; and collect deposits from stores which do a daily cash business.

Commercial Motor Transport

Railroad Executive Sees Advantage in Flexibility of Truck Operation and Adaptability for Performing Terminal Portion of Freight Service.

(By ELISHA LEE, Vice President Pennsylvania Railroad.)

FEW present day developments in transportation surpass in importance the rapidly growing use of motor vehicles as common carriers, particularly in the freight service.

Public discussion of the subject, however, often goes astray in dealing with the motor truck exclusively as a rival or competitor of the railroads. The inference seems to be that it can live only on profits taken away from the rail lines, and that its future importance to

the country must be judged from that aspect.

Personally, I do not subscribe to these views. The importance and value of commercial motor transport to the country as a whole will not lie in menacing or injuring the railroads, but in the extent to which it is capable of aiding them to greater usefulness by assisting in the improvement of their indispensable public service and in the solution of their problems of operation and earnings.

THE railroads are evolving into wholesale transportation machines. They are becoming more and more adapted to the handling of goods and commodities in bulk—to the movement of full car loads and long trains. This development is a natural response to the needs of a country having such enormous quantities of freight to transport over such vast distances. The railroads still do a great deal of purely retail business. Some of it perhaps pays its way, but much of it unquestionably entails a loss, either directly or by reason of the bulk traffic which it crowds out.

This is particularly true of less than car load freight. In the immediate vicinity of all our highly developed industrial and commercial communities, an immense amount of such traffic originates. A large portion of it moves only a few miles, but in its handling we are obliged to employ the most costly and over-worked facilities which the railroads own, viz., their yards and terminals in the great centers of industry and population. As every one knows, the increasing expense of constructing, maintaining and operating such terminal facilities has become one of the greatest problems of railroad financing, while nearly every period of railroad congestion has had its principal cause in terminal overcrowding.

Here is a real opportunity for the

motor truck to demonstrate its utility upon a true economic basis. The reason why less than car load traffic, especially on the shorter hauls, is becoming a growing burden upon the railroads, is that we are obliged to use in it terminal facilities and rolling stock which are too expensive for the purpose, and which of necessity must be primarily planned and adapted to the handling of bulk traffic, mostly moving over the longer hauls.

Therefore, I believe it to be at least probable that in many instances the short haul less-than-car load freight traffic could be turned over bodily to motor trucks, with resulting advantage to the railroads and their patrons, and with reasonable profits to the truck owners. That outcome, if realized, would assuredly be beneficial to the country in general.

It is possible to imagine an extension of the same ideas by which long distance, as well as short distance, less-than-car load freight can also be handled, which increased efficiency over present methods, through a plan of combined truck and railroad service. This would involve detachable bodies on freight carrying trucks. The bodies would be so constructed as to be used as containers for less-than-car load freight, and when loaded would be placed upon suitably equipped railroad cars for the intermediate jour-

ney between the rail terminals; the service at each end, to and from the rail terminals, including "store-door" collection and delivery, being performed by the trucks.

Service of this character is emerging from the purely theoretical stage, and many competent authorities believe that it has a great and promising future. Its advantage lies in using both the trucks and the railroads for the portions of the through service which they are best fitted to perform. The railroads can do the long distance hauling between terminals better than the trucks, and the trucks can do the work between shipper, or consignee, and terminal better than the railroads.

I wish to add a word of caution. It is not just or reasonable to permit motor trucks to take the cream of the less-than-car load freight and leave the skimmed milk for the railroads. If the trucks are to handle that traffic at all, in a given area, they should take it in its entirety so that the railroads may discontinue altogether their organizations and arrangements for taking care of that form of freight service, when it can be done by trucks more advantageously and more satisfactorily to the public. This entire matter is now being studied by railroad managements. The outlook is promising, but there are some practical difficulties which must be overcome before acceptable results can be hoped for

from putting the plan into actual operation on any general scale.

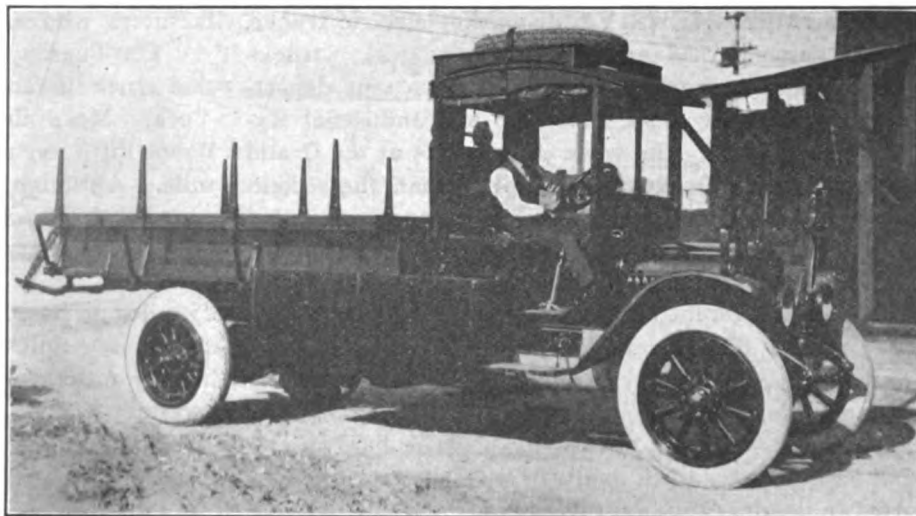
There is one point on which my own mind is clear. The shipment of freight from one station to another, within the same terminal area or city, is a form of service from which the railroads should as nearly as may be possible, be entirely relieved. All intra-city freight should be trucked, save that small proportion which, by reason of excessive weight or bulk, requires railroad equipment and roadbeds for its proper transportation.

Similarly the interchange of less-than-car load through freight between the terminals of various railroads coming into a given city constitutes another field in which motor trucks may prove valuable helpers of the rail lines as less costly substitutes for inter-line switching. In this case the proper development calls for the use of a large number of detachable bodies in connection with a relatively small number of chassis to perform the interchange service. The plan is being tried with some success in several middle western cities and may later be found capable of further extension.

The use of motor trucks as feeders to railroad systems in such manner as to perform practically the function of branch lines is still in its infancy. Its possibilities deserve and, doubtless, will receive increasing attention in the future. Few railroad branch lines of the present time are profitable; many—probably the majority—are operated at heavy losses. There is little incentive to establish new ones, or inducements to supply the funds required for such purposes. Here is another chance for the motor truck to test out its worth.

Granting an adequate basis of taxation to compensate for the otherwise free use of highways constructed and maintained by the public, it is not my belief that motor trucks are destined ever to rival the railroads in the field of car load or bulk transportation, especially over the longer hauls. Highways capable of sustaining a heavy motor truck service cost more to build and

Truck Does Work of Three



Modern Methods of Doing Things Usually Are Decided from the Viewpoint of Efficiency and When the Shell Oil Company Found That the Three Trucks They Were Using Were Each One Idle a Part of the Time the Matter Was Given Careful Consideration with Result That One Truck Now Does the Work Which the Three Machines Formerly Handled. The Vehicle, Which Is Illustrated, Not Only Hauls a Complete Service Station, but After Unloading Can Be Pressed Into Service to Haul Sand and Gravel for the Construction of the Runways and After Working Hours Takes the Men Back to Their Homes—a True Exponent of Real Efficiency.

THE Shell Oil Company has found a way to make one motor truck do the work that it formerly took three trucks to accomplish. Their new truck which has just been assigned to the service station building crew is one of best examples of efficient truck units known.

This truck is built to handle all the hauling requirements in the construction of oil filling stations. Its seating arrangement allows for the transportation of the crew. There is sufficient loading space to haul a complete knocked down service station. Extension brackets on the

front fenders enable the truck to carry pipe lengths of 20 to 30 feet. Along each side is a cabinet containing 12 bins for carrying parts, pipe fittings, electric light equipment and all necessary accessories to building. The body is so constructed that after the service station has been unloaded it can be converted into a dump truck to handle the gravel and dirt used in construction of service station runways.

This truck has more than proven its worth and another soon may be added to take care of increasing business.

keep in repair than do standard railroad lines, and the latter can, when dealing with the larger quantities, carry each ton a mile for a far lower total cost. Moreover, the superiority of railroads in contending with severe weather conditions and in being ready to handle any and all kinds of traffic when offered is obvious, and, in my opinion, not likely to be impaired.

The advantages of trucks lie in the flexibility of their operation and in the fact that they do not require elaborate and expensive terminal facilities. They seem especially adapted for handling less-than-car load traffic over short distances and

on good roads and well paved streets, and for performing the terminal portions of the service required in the collection or delivery of through or long distance less-than-car load rail traffic. In the one instance they are capable of giving service to points not reached by the railroads and of helping to relieve the railroads of a burden; in the other instance they directly act as auxiliaries to the railroads in performing their service to the public. In both cases they should prove useful aids in increasing and extending the utility of our existing railroad system.—Courtesy of National Automobile Chamber of Commerce.

Electric Trucks Exhibited in New York

A COMPREHENSIVE display of electric trucks, passenger cars and industrial trucks made up one of the most important departments of the New York Electrical and Industrial Exposition held during the week of Oct. 7-14 at the Grand Central Palace. Occupying more than half the second floor of the building, they formed a distinctive exhibit and were a center of interest for merchants and manu-

facturers who are confronted with delivery problems.

On Tuesday, Oct. 10, the exhibitors held an electric truck parade, the first ever undertaken in New York. More than 150 vehicles participated, rolling down Fifth avenue in a column that extended nearly a mile. Although the parade was held under the auspices of the manufacturers, the trucks themselves were entered by users and owners.

EIGHTY different owners, representing 30 different classes of service put their delivery equipment in the parade.

The procession was headed by a band on a five-ton truck and was escorted by a squad of motorcycle police. The start was from 67th street and Fifth avenue and the parade broke up at Washington square, a distance of about three miles. For the time the parade was on the avenue, south bound traffic was diverted to other streets. It was a big day for electric vehicles and not the least interesting element of the proceedings was the fact that not in years have so many commercial vehicles been seen on "the avenue" at one time.

Several years ago Fifth avenue placed a ban on commercial vehicles of all sorts and restricted itself exclusively to passenger cars. This ban was temporarily lifted to permit the holding of the parade. Following the parade there was a perceptible increase in interest in the vehicles shown at the Electrical Show.

The show served to introduce to New York its first electric taxicab. The vehicle, one of 50 being built by the Rauch & Lang Corporation for the Electrotaxi Corporation of 1292 Madison avenue, will go in service on Nov. 1. The first 10 have been completed and the balance will follow as the business increases. The cabs are painted a combination of two tones of gray—in striking contrast with some of the color schemes adopted to taxicab companies. They have a wheelbase of only 102 inches, and as the control is entirely by means of a hand-operated lever, with no gears to shift, they will be easy to handle in the traffic congested streets of New York. Their

maximum speed is 25 miles an hour. Their operating radius of 120 miles a day is accomplished by means of an interchangeable battery system. The battery cradle is especially designed for rapid changing, and it will be possible to remove an exhausted battery and replace it with a fresh one in about the same time

MOTOR TRUCK AN AID TO FURNITURE BUSINESS.

"WHILE the 'cash-and-carry' plan may work out successfully in other lines of business, it will never be a success in the handling of furniture, and the furniture company that can expect the greatest success will be the one that pays close attention to its delivery service."

That is the opinion of Thomas H. Rogers, president of the Rogers Furniture Company of El Paso, Tex., the largest dealer in the southwest, as given in a letter to the General Motors Truck Company of Pontiac, Mich.

"Naturally in trying to handle goods quickly I tried to make a point of a quick delivery service and was among the first merchants of this city to adopt the motor truck for hauling my goods," says Mr. Rogers. Being among the first I sometimes became discouraged because the trucks we secured in those early days were not the dependable equipment we were able to get in later years.

"It is about six years since I purchased our first GMC truck and since that time our problems of transportation and delivery over these roads have been practically ended."

that would be required to fill up a gasoline tank. It is also expected that the electric cabs will be a big factor for safety on the crowded streets. The insurance companies recognize the safety of electric cabs by giving a 25 per cent. reduction in the premium for liability insurance.

The Electric Vehicle Bureau of the New York Edison Company displayed an interesting series of charts pointing out the advantages of electrics. One of these showed that the electric vehicle investment in New York is \$23,000,000; another showed that five electric wagons require no more street space than three horse-drawn vehicles of the same capacity; another showed that 2448 of the electrics in New York are more than seven years old, that 1285 are five years old and that 25 are 21 years old. With this chart was the significant phrase, "Figure out depreciation." Another chart was called the dollar race and showed graphically the relative distances that electric, gasoline and horse-drawn vehicles of different capacities could cover for \$1.

Among the vehicle exhibitors at the show were the Milburn Wagon Company, the Baker Rauch and Lang New York Corporation, the Commercial Truck Company, O B Electric Vehicles, Inc., the Walker Vehicle Co., the Ward Motor Vehicle Company, the Steinmetz Electric Motor Car Corporation and the Kelland Motor Car Co., storage batteries, motors, charging apparatus and accessories were exhibited by the Cutler-Hammer Manufacturing Company, the Edison Storage Battery Company, the General Electric Company, the Philadelphia Storage Battery Company, the Westinghouse Co. and the Electric Repairs Co.

Motor Truck Price Changes Since Nov. 15, 1921*

Date	Trucks	Tons Capacity	Old Price	New Price	Dec. Inc.	Date	Trucks	Tons Capacity	Old Price	New Price	Dec. Inc.
March 4, 1922	Acason	1 1/2	\$1650			Jan. 1, 1922	Champion	1/2	1195	1050	145
March 4, 1922	Acason	1 1/2	2485	\$1950	\$535	Aug. 1, 1922	Chevrolet—Superior			425	
March 4, 1922	Acason	2 1/2	3295	2750	545	Aug. 1, 1922	Chevrolet—Delivery			510	
March 4, 1922	Acason	3 1/2	4295	3450	845	Aug. 1, 1922	Chevrolet—G			650	
March 4, 1922	Acason	5	5250	4350	900	Aug. 1, 1922	Chevrolet—T			1095	
	Acme G	1/2	1790			June 1, 1922	Climber	1/2		1050	
	Acme B	1	2100			June 1, 1922	Climber	1 1/2		1950	
	Acme F	1 1/2	2425				Clydesdale, 10		1485		
	Acme A	2	2975				Clydesdale, 18	1/2-1 1/2	1890		
	Acme AC	2 1/2	3375				Clydesdale, 20	1-1 1/2	2385		
	Acme C	3 1/2	3950				Clydesdale, 20	1-1 1/2	2435		
	Acme E	5	4975				Clydesdale, 42	1 1/2-2 1/2	2475		
	Advance-Rumely		1995				Clydesdale, 65	2 1/2-3 1/2	3250		
	Alena F—steam	2	3500*				Clydesdale, 65	2 1/2-3 1/2	3275		
	Alena H—steam	5	5700*				Clydesdale, 65	2 1/2-3 1/2	3275		
	All-American—bus	1	1465*				Clydesdale, 65E	2 1/2-3 1/2	3450		
	All-American	1 1/2-2	1915*				Clydesdale, 65E	2 1/2-3 1/2	3475		
	American	2 1/2	3350				Clydesdale, 65E	2 1/2-3 1/2	3475		
	American	4	4275				Clydesdale, 90	3 1/2-4 1/2	4100		
	American	5	4500				Clydesdale, 90	3 1/2-4 1/2	4125		
	American B-1 Steam	4	5000				Clydesdale, 120	5-6	4500		
	Atlas-Merch. Dispatch		1185				Clydesdale, 120	5-6	4550		
Aug. 1, 1922	Atterbury 20R	1 1/2	2475			Dec. 1, 1921	Collier, 18	1	2150	1850	300
Aug. 1, 1922	Atterbury 22C	2 1/2		3375		Dec. 1, 1921	Collier, 19	1 1/2	2550	1950	600
Aug. 1, 1922	Atterbury 22C	2 1/2		3475		Dec. 1, 1921	Collier, 20	2	2850	2150	700
Aug. 1, 1922	Atterbury 22D	3 1/2		4275		Dec. 1, 1921	Collier, 22	2 1/2	3450	2345	1105
Aug. 1, 1922	Atterbury 22D	3 1/2		4375		May 1, 1922	Columbia, H	1 1/2		1895*	
	Atterbury 8E—S. W.	5	4975			Feb. 1, 1922	Columbia, G	2 1/2	2850	2335	515
	Atterbury 8E—L. W.	5	5125				Comet	1 1/2	1950		
Jan. 3, 1922	Autocar F		2300	1950	350	May 1, 1922	Commercial-Electric	1/2-1 1/2		1585	
Jan. 3, 1922	Autocar G		2400	2050	350	May 1, 1922	Commercial-Electric	1/2		1985	
Jan. 3, 1922	Autocar Y		4350	3950	400	May 1, 1922	Commercial-Electric	1		2150	
Jan. 3, 1922	Autocar B		4500	4100	400	May 1, 1922	Commercial-Electric	2		2575	
Jan. 3, 1922	Autocar H			2950		May 1, 1922	Commercial-Electric	3 1/2		3550	
Jan. 3, 1922	Autocar K			3075		May 1, 1922	Commercial-Electric	3 1/2		3550	
	Available, JH	1 1/2	2450			May 1, 1922	Commercial-Electric	5		3960	
	Available, H	2 1/2	3160			Aug. 1, 1922	Commerce, 9	1/2-1 1/2		1150*	
	Available, H	3 1/2	4175			Nov. 18, 1921	Commerce	1 1/2		1450*	
	Available, H	5	5375			Nov. 18, 1921	Commerce	1 1/2	2050	1695	355
	Beck-Hawkeye	1 1/2	2050	1725	325	Nov. 18, 1921	Commerce	1 1/2	2255	1800*	455
	Beck-Hawkeye	2	2150	1810	340	Nov. 18, 1921	Commerce	2		1995	
	Beck-Hawkeye	2 1/2	2850	2395	455	Nov. 18, 1921	Commerce, 16	2		2150*	
	Bessemer G	1	1395	1795*	1300	Nov. 18, 1921	Commerce	2 1/2		2150	
	Bessemer H 2	1 1/2	1995	2395*	1400	Nov. 18, 1921	Commerce	2 1/2		2495*	
	Bessemer J 2	2 1/2	2595	2895	1300	Nov. 18, 1921	Commerce, 25	2 1/2		2770*	
	Bessemer K 2	4	3495	3695	1200	Nov. 18, 1921	Commerce, 25	2 1/2		2425	
May 29, 1922	Bethlehem KN	1		1195		Feb. 1, 1922	Commerce, Charabanc			2350*	
May 29, 1922	Bethlehem GN	2		1595		Feb. 1, 1922	Concord, A	1 1/2	2500		
May 29, 1922	Bethlehem HN	3		2195			Concord, A	2	3150		
July 15, 1922	Betz	1-1 1/2		1850			Concord, AX	2	3250		
July 15, 1922	Betz	2 1/2-3		2985			Concord, B	3	3600		
July 15, 1922	Betz—Bus	20 pas.		3000			Concord, BX	3	3600		
July 15, 1922	Betz—Bus	28 pas.		5200			Concord—Bus			3700*	
	Brockway E	1/2-1	1675	1590	85	Jan. 1, 1922	Corbitt H-22	1	2200	1480	720
	Brockway S 5	1 1/2	2250			Jan. 1, 1922	Corbitt E-22	1 1/2	2600	2200	400
	Brockway K 5	2 1/2	3200			Jan. 1, 1922	Corbitt C-22	2	3150	2600	550
	Brockway R 4	3 1/2	4100			Jan. 1, 1922	Corbitt B-22	2 1/2	3300	3000	300
	Brockway T 4	5	4750			Jan. 1, 1922	Corbitt R-22	3		3200	
Aug. 1, 1922	Buick—Open express	1/2	945	840	105	Jan. 1, 1922	Corbitt A-22	3 1/2-4	4100	3800	300
Aug. 1, 1922	Buick—Canopy Top	1/2	965	855	110	Jan. 1, 1922	Corbitt AA-22	5	5000	4500	500
Aug. 1, 1922	Buick—Panel Side	1/2		860			Day-Elder A-S	1	1600*		
Aug. 1, 1922	Buick—Panel Side	1/2		880			Day-Elder B	1 1/2	2000		
Aug. 1, 1922	Buick—de-luxe	1/2		960			Day-Elder D	2	2400		
April 1, 1922	Buffalo	1 1/2		2750			Day-Elder C	2 1/2	2750		
Jan. 15, 1922	Buffalo	2 1/2	3600	3400	200		Day-Elder F	3 1/2	3150		
							Day-Elder E	5	4250		
							Dearborn E	1	1250*		
							Dearborn FX	1 1/2	2300		
							Dearborn F	1 1/2	2180		
							Dearborn 48	2	2590		
							Defiance G	1	1695	1525	170
							Defiance D	1 1/2	2095	1695	400
							Defiance E	2	2275	1895	380

These figures furnished through courtesy of National Automobile Chamber of Commerce.

†Increase.

*Pneumatic equipped trucks.

Date	Trucks	Tons Capacity	Old Price	New Price	Dec. Inc.	Date	Trucks	Tons Capacity	Old Price	New Price	Dec. Inc.
Jan. 1, 1922	Denby 31	1 1/4	1625	1485	140	May 1, 1922	G. M. C. K-71A	3 1/2	3950	3600	350
Jan. 1, 1922	Denby 33	1 1/2-2	2300	2145	155	July 17, 1922	G. M. C. K-71T	...	...	3700*	...
Jan. 1, 1922	Denby 34	2	2600	2395	205	May 1, 1922	G. M. C. K-101A	5	4350	3950	400
Jan. 1, 1922	Denby 35	2 1/2-3	...	2795	...	July 17, 1922	G. M. C. K-101T	...	...	4050*	...
Jan. 1, 1922	Denby 27	4	4200	3895	305	April 1, 1922	G. M. C. K-20 Bus	...	...	2550*	...
Jan. 1, 1922	Denby 210	5	4850	4295	555						
Jan. 1, 1922	Denby 214	7	5500	4945	555						
	Dependable A	3/4-1	1650*	...	...		Gersix, M	1 1/2	3100	...	...
	Dependable C	2	2350	...	...		Gersix, K	2 1/2	3500	...	...
	Dependable D	2 1/2	2650	...	...		Gersix, L	3 1/2	4500	...	...
	Dependable E	3	2950	...	...		Giant, 15-A	1 1/2	2250	...	...
	Dependable G	3 1/2	3550	...	...		Giant, 16	2 1/2	3150	...	...
							Giant, 17	3 1/2	4150	...	...
	Diamond T-03	1	1975	...	...	Feb. 1, 1922	Graham	1	1370	1265	105
	Diamond T-T	1 1/2	2250	...	...	Feb. 1, 1922	Graham	1 1/2	1430	1325	105
	Diamond T-FS	1 1/2	2525	...	...	Feb. 1, 1922	Graham-Bus	1 1/2	2240	2135	105
	Diamond T-U	2-2 1/2	2650	...	...				
	Diamond T-K	3 1/2	3750	...	...	Aug. 15, 1922	Gramm Pioneer 10	1	1365	1245*	120
	Diamond T-EL	5	4325	...	...	Aug. 15, 1922	Gramm Pioneer 15	1 1/2-2	1900	1750	150
	Diamond T-S	5	4500	...	...	Aug. 15, 1922	Gramm Pioneer 65	1 1/2-2	2500	2250	250
Feb. 1, 1922	Dodge Panel	...	1135	980	155	Aug. 15, 1922	Gramm Pioneer 20	2-2 1/2	2925	2725	200
Feb. 1, 1922	Dodge Screen	...	1035	880	155	Aug. 15, 1922	Gramm Pioneer 30	3	3275	3300	125
May 1, 1922	Dorris K-2	1	...	2490	...	Aug. 15, 1922	Gramm Pioneer 75	3 1/2	...	4225*	...
	Dorris K-4	2-2 1/2	3400	...	...	Aug. 15, 1922	Gramm Pioneer 40	4	3975	3850	125
	Dorris K-7	3 1/2	4400	...	...	Aug. 15, 1922	Gramm Pioneer 50-60	5-6	4595	4450	445
Aug. 25, 1922	Dort	...	...	825	...	June 3, 1922	Hahn	2	225	2275	150
	Drake, T-60	2	2495	...	...		Hall	2 1/2	3275	...	...
	Duplex A	2	2775*	...	...		Hall	3 1/2	4100	...	...
Feb. 27, 1922	Duplex EL	3 1/2	4450	3700	750		Hall	5	5100	...	...
Feb. 27, 1922	Duplex E	3 1/2	4250	3500	750		Hall	5-7	5100	...	...
	Duplex AB-Bus	...	3075*	...	...	Jan. 30, 1922	Harvey WOA	...	2950	2650	300
	Duty	2	1590	...	...	Jan. 30, 1922	Harvey WFA	...	3300	2950	350
	Duty	2	1690	...	...		Hawkeye K	1 1/2	1850	...	...
June 5, 1922	Eagle, 101	1 1/2	...	1875	...		Hawkeye M	2	2650	...	...
April 4, 1922	Electrocar-Bus	...	...	2975	...		Hawkeye N	3 1/2	3700	...	...
Feb. 1, 1922	Eugol	1	...	1795	...		H. R. L-L	3/4-1	1700	...	...
	Fageol	1 1/2-2	3000	...	...		H. R. L-H	2 1/2	3650	...	...
	Fageol	2 1/2-3	3900	...	...		H. R. L-R	2	3250	...	...
	Fageol	3 1/2-4	5000	...	...	July 1, 1922	Huffman B	1 1/2-2	1995	1795	200
	Fageol	5-6	5700	...	...	July 1, 1922	Huffman C	1 1/2-2	1795	1695	100
July 1, 1922	Fageol-Bus	20-22 pas.	...	8000	...	July 1, 1922	Huffman D	2-3	...	2895	...
July 1, 1922	Fageol-Bus	27 pas.	...	8500	...	March 1, 1922	Hurlburt, AA	...	...	1950	...
July 1, 1922	Fageol-Bus-de-luxe	12 pas.	...	9000	...	March 1, 1922	Hurlburt, BB	2-2 1/2	...	2800	...
	Federal R2	3/4-1	1375*	...	...	March 1, 1922	Hurlburt, CC	3-3 1/2	...	3475	...
	Federal SD	1	1800	...	...	March 1, 1922	Hurlburt, DD	4-4 1/2	...	4150	...
	Federal TE	1 1/2	2175	...	...	March 1, 1922	Hurlburt, EE	5 1/2-6	...	4850	...
	Federal UE	2	2425	...	...		Independent, B	1	1665	...	...
	Federal WE	3 1/2	3150	...	...		Independent, G	1 1/2	2040	...	...
	Federal X2	5-6	4500	...	...		Independent, HI	2 1/2	2940	...	...
Jan. 16, 1922	Ford TT	1	445	430	15	Aug. 25, 1922	Indiana-Highway Ex.	1	...	1425*	...
	F. W. D-B	3	4200	...	...	Feb. 18, 1922	Indiana-12	1 1/2	1745	...	...
April 1, 1922	Fulton A	1	1750	1495	255	Feb. 18, 1922	Indiana-20	2	2985	2685	300
April 1, 1922	Fulton C	2	2350	1985	365	Feb. 18, 1922	Indiana-25	2 1/2	3375	2985	390
Nov. 19, 1921	Garford 15	3/4-1	...	1590	...	Feb. 18, 1922	Indiana-35	3 1/2	4055	3875	210
Nov. 19, 1921	Garford 15	3/4-1	...	1710	...	Feb. 18, 1922	Indiana-51	5	4825	4500	325
Nov. 19, 1921	Garford 15	3/4-1	...	1780	...	Aug. 25, 1922	International, S	1	1500	1250	250
Nov. 19, 1921	Garford 15	3/4-1	...	1815	...	Aug. 25, 1922	International, 21	1	1750	1550	200
Sept. 1, 1922	Garford 25-B	1 1/4-1 1/2	1990	2190	1200	Aug. 25, 1922	International, 31	1 1/2	1850	1650	200
Nov. 19, 1921	Garford 25-BL	1 1/4-1 1/2	2140	2040	100	Aug. 1, 1922	International, 41	2	2100	...	...
Nov. 19, 1921	Garford 70-H	2-2 1/2	3190	2750	440		International, 52-Bus	...	...	3200	...
Nov. 19, 1921	Garford 70-HL	2-2 1/2	3190	2750	440		International, 61	3	2400	...	...
Nov. 19, 1921	Garford 77-D	3 1/2-4	4390	3750	640		International, 101	5	3600	...	...
Nov. 19, 1921	Garford 77-DL	3 1/2-4	4490	3850	640		Jackson 4WD	3 1/2	3850	...	...
Nov. 19, 1921	Garford 68-DL	5	5300	4600	700	Aug. 15, 1922	Kalamazoo, T	1	...	1295	...
Nov. 19, 1921	Garford 68-DL	5	5300	4600	700	March 10, 1922	Kalamazoo, G-I	1 1/2	2495	1800	695
Nov. 19, 1921	Garford 150-A	7 1/2	5500	5200	300	March 10, 1922	Kalamazoo, L-G	2	...	2645	...
Nov. 19, 1921	Garford 150-AL	7 1/2	5600	5300	300	March 10, 1922	Kalamazoo, N-H	3	...	3145	...
Nov. 19, 1921	Garford 725-Bus	...	...	2750	...	March 10, 1922	Kalamazoo, H-D	...	3700	3350	350
Nov. 19, 1921	Garford 51-B-Bus	...	...	4250	...	March 10, 1922	Kalamazoo, S-K	4	...	3845	...
April 1, 1922	Gary, F	1-1 1/2	1675	...	...	March 10, 1922	Kalamazoo, O-K	5	...	4350	...
April 1, 1922	Gary, I	2	2150	2250	100	March 6, 1922	Kearns-Dughie H	1	1600	1150	450
April 1, 1922	Gary, IL-Bus	...	2250	2350	100	March 6, 1922	Kearns-Dughie M	2	2200	1650	550
April 1, 1922	Gary, J	2 1/2	2550	2650	100	Jan. 16, 1922	Kelly-Springfield, K-31	1 1/2	2900	2700	200
April 1, 1922	Gary, K	3 1/2	3550	3650	100	Jan. 16, 1922	Kelly-Sp'field, K-34 1 1/2	2 1/2	3000	2700	300
April 1, 1922	Gary, M	5	4000	4100	100	Jan. 16, 1922	Kelly-Springfield, K-38	2 1/2	3250	2900	350
May 1, 1922	G. M. C. K-16	1	1495	1295	200	Jan. 16, 1922	Kelly-Springfield, K-40	3 1/2	4200	3900	300
May 1, 1922	G. M. C. K-41A	2	2775	2375	400	Jan. 16, 1922	Kelly-Springfield, K-42	3 1/2	4200	3900	300
July 17, 1922	G. M. C. K-41T	...	...	2450*	...	Jan. 16, 1922	Kelly-Sp'field, K-41	3 1/2-5	4200	3900	300
						Jan. 16, 1922	Kelly-Springfield, K-50	5	4990	4400	500
						Aug. 25, 1922	Kelly-Springfield, K-61	6	...	4800	...

Date	Trucks	Tons Capacity	Old Price	New Price	Dec. Inc.	Date	Trucks	Tons Capacity	Old Price	New Price	Dec. Inc.
Jan. 1, 1922	Keystone	2	1975	...	...		Napoleon	1	1535	...	...
Jan. 1, 1922	Keystone	2	2075	...	...		Napoleon	1½	1860	...	...
Jan. 1, 1922	Keystone	2	2175*	...	...		Napoleon	2	2708	...	...
	Kissel (Gen. Utility)	...	1975	...	...		Napoleon—Bus	14 pas.	2200	...	...
	Kissel (Freighter)	...	2875	...	...	Feb. 17, 1922	Nash 2018	1-1½	1895	1595	300
	Kissel (Heavy Duty)	...	3675	...	...	Feb. 17, 1922	Nash 3018	2-2½	2550	2150	400
	Kissel (Ton Express)	...	...	1585	...	Feb. 17, 1922	Nash 3018 L. W. B.	2-2½	2600	2200	400
Aug. 25, 1922	Kleiber AA	1	2600	2400	200	Feb. 17, 1922	Nash Quad.	2-2½	3250	2750	500
Aug. 25, 1922	Kleiber A	1½	3100	2800	300	Feb. 17, 1922	Nash Quad. L. W. B.	2-2½	3300	2800	500
Aug. 25, 1922	Kleiber BB	2	3600	3200	400	Feb. 17, 1922	Nash 5018	2½	2550	2250	300
Aug. 25, 1922	Kleiber B	2½	3950	3600	350	April 1, 1922	Nelson	¾-1	...	995	...
	Kleiber C	3½	4600	4600	...	April 1, 1922	Nelson, 15	1½	...	2295	...
	Kleiber D	5	5300	5300	...	April 1, 1922	Nelson, 20	2	...	2520	...
May 1, 1922	Krebs-Collier	¾	...	1260	...	April 1, 1922	Nelson, 25	2½	...	2650	...
May 1, 1922	Krebs-Collier	1	...	1565	...	April 1, 1922	Nelson, 30	3	...	3060	...
May 1, 1922	Krebs-Collier	1½	...	2125	...	April 1, 1922	Nelson, 35	3½	...	3900	...
May 1, 1922	Krebs-Collier	2½	...	2875	...	April 1, 1922	Nelson, 40	4	...	4400	...
May 1, 1922	Krebs-Collier	3½	...	2975	...		Noble, A—21	1-1½	1840	...	...
May 1, 1922	Lange, B (with cab)	...	...	3350	...		Noble, B—31	1½-2	2480	...	...
May 1, 1922	Lange, E	...	...	3450	...		Noble, D-51	2½-3	2950	...	...
	Larrabee, U	1½-2½	2400	...	...		Noble, E-71	3½-5	3800	...	...
Feb. 15, 1922	Larrabee, J	1½-2½	...	2400	...	Jan. 1, 1922	Northway	1	...	1700	...
Feb. 15, 1922	Larrabee, SK	2½-3	3200	3100	100	Jan. 1, 1922	Northway	1	...	1850	...
Feb. 15, 1922	Larrabee, EK	2½-3	3200	3100	100	Jan. 1, 1922	Northway	2	...	3300	...
Feb. 15, 1922	Larrabee, SK 5	2½-3½	...	3450	...	Jan. 1, 1922	Northway	3½	...	4200	...
Feb. 15, 1922	Larrabee, EK 5	2½-3½	...	3450	...	Jan. 1, 1922	Northway	5	...	4500	...
Feb. 15, 1922	Larrabee, SL 4	3½-4½	...	4000	...		Northwestern, W	1½	2700	...	...
Feb. 15, 1922	Larrabee, EL 4	3½-4½	...	4000	...		Northwestern, WS	2½	3500	...	...
Feb. 15, 1922	Larrabee, SL 5	3½-5	...	4400	...		O. B.—Elec.	1	2175	...	...
Feb. 15, 1922	Larrabee, EL 5	3½-5	...	4400	...		O. B.—Elec.	2	2650	...	...
Feb. 15, 1922	Larrabee, W	5-7	...	4800	...		O. B.—Elec.	3½	3750	...	...
	Louisiana, 2—20	2	1750	...	...		O. B.—Elec.	5	3950	...	...
	Maccar L	1½	2700	...	...	Feb. 15, 1922	O'Connell—40	...	...	2450	...
	Maccar H-A	2	3100	...	...	Feb. 15, 1922	O'Connell—50	...	...	3300	...
	Maccar H-2	3	3400	...	...	Feb. 15, 1922	O'Connell—70	...	...	4150	...
	Maccar M-2	4	4200	...	...	Feb. 15, 1922	O'Connell—100	...	...	4500	...
	Maccar G	5-6	4950	...	...		O. K.—B.	1½	1750	...	...
	Maccar—Bus	...	3400	...	...		O. K.—K	1½	2000	...	...
	MacDonald, AB	...	5750	...	...		O. K.—L	2½	2900	...	...
	MacDonald, AB com.	...	8400	...	...		G. K.—M	3½	3950	...	...
	Mack AB D. R.	1½	3450	...	...		Old Hickory W	1	2175	...	...
	Mack AB Chain	1½	3000	...	...	July 31, 1922	Old Reliable—D	5	5250	5000	250
	Mack AB D. R.	2	3750	...	...		Olds-Econ.	1	1095	...	...
	Mack AB Chain	2	3300	...	...		Olds-Econ. (with cab)	1	1175	...	...
	Mack AB Chain	2½	3400	...	...		O.-E. (with ex. b. & t.)	1	1245	...	...
	Mack AB D. R.	2½	3850	...	...		Olympic	2½	3200	...	...
	Mack AC Chain	3½	4950	...	...	May 1, 1922	Oneida, B	1½	...	2825	...
	Mack AC Chain	5	5500	...	...	May 1, 1922	Oneida, B	1½	...	2565	...
	Mack AC Chain	6½	5750	...	...	May 1, 1922	Oneida, C	2½	...	3200	...
	Mack AC Chain	7½	6000	...	...	May 1, 1922	Oneida, C	2½	...	3245	...
	Mack Trac. AB	5	3400	...	...	May 1, 1922	Oneida, D	3½	...	4050	...
	Mack Trac. AC	7	4950	...	...	May 1, 1922	Oneida, D	3½	...	4105	...
	Mack Trac. AC	10	5500	...	...	May 1, 1922	Oneida, E	5	...	4725	...
	Mack Trac. AC	13	5750	...	...	May 1, 1922	Oneida, E	5	...	4785	...
	Mack Trac. AC	15	6000	...	...		Oshkosh, A	2	3750	3250	500
Jan. 25, 1922	Master JW	1½	2690	2290	400		Oshkosh, AA	2	3850	3400	450
Jan. 25, 1922	Master W	2½	3290	2890	400		Oshkosh, B	2½	4150	3850	300
Jan. 25, 1922	Master D	2½	3540	3190	350		Oshkosh, BB	2½	4300	4000	300
Jan. 25, 1922	Master A	3½	4190	3990	200	April 1, 1922	Overland	...	...	450	...
Jan. 25, 1922	Master E	3½	4640	4290	350	April 1, 1922	Packard EC	2	3500	3100	400
Jan. 25, 1922	Master Y	4	...	4490	...	April 1, 1922	Packard EX	2	4000	3500	500
Jan. 25, 1922	Master B	5	5290	4990	300	April 1, 1922	Packard ED	3	4100	...	...
Jan. 25, 1922	Master F	5	5440	5090	350	April 1, 1922	Packard EF	5	4500	...	...
Jan. 25, 1922	Master Tract. DDT	6	3740	3390	350	April 10, 1922	Paige 52-19	1½	2880	1950	930
Dec. 9, 1921	Maxwell	1½	1332	932	400	Feb. 16, 1922	Paige 54-20	2½	3400	2420	980
Aug. 25, 1922	Maxwell	1½	...	1097*	...	Feb. 16, 1922	Paige 51-18	3½	4285	3145	1140
May 1, 1922	Menominee—Hurryton	1	...	1650	...	Jan. 9, 1922	Parker	1½	2950	1875	1075
Jan. 26, 1922	Menominee HT	1½	2080	2000	80	Jan. 9, 1922	Parker	2½	3650	3200	450
Jan. 26, 1922	Menominee H	1½	2725	2475	250	Jan. 9, 1922	Parker	3½	4400	3950	450
Jan. 26, 1922	Menominee D	2-2½	3245	2875	370	April 17, 1922	Parker	5	5500	4850	650
Jan. 26, 1922	Menominee G	3½	4270	3500	470		Pierce-Arrow—Bus	...	3200	...	...
Jan. 26, 1922	Menominee J-3	5	5450	4850	600		Pierce-Arrow	2	3200	...	...
	Milburn 27-D	¾	1115*	...	...		Pierce-Arrow	3½	4350	...	...
	Milburn, 43	½	1585*	...	...		Pierce-Arrow	5	4850	...	...
	Milburn, 40	1	1985*	...	...	April 27, 1922	Pittsburgher	2	3500	3000	500
	Moreland, RR	1	1595*	...	...	April 27, 1922	Pittsburgher	2½-3	...	3600	...
	Moreland, BX	1½	1980	...	...	April 27, 1922	Pittsburgher	3½	...	3800	...
	Moreland, EX	2	2800	...	...				
	Moreland AX	3	3500	...	...				
	Moreland, RX	5	4600	...	...				
March 1, 1922	Mutual, 2B	2½	3450	3400	50						
March 1, 1922	Mutual, 2B	2½	4050	3925*	125						

Date	Trucks	Capacity Tons	Price Old	Price New	Inc. Dec.	Date	Trucks	Capacity Tons	Price Old	Price New	Inc. Dec.
May 1, 1922	Rainier, 31	¾	1990	1970	20	July 5, 1922	Steinmetz-Elec.—15 ..	¾	3685	...	...
May 1, 1922	Rainier, 29	1	2150	2150*	100	July 5, 1922	Steinmetz-Elec.—15 ..	¾	2905	...	...
May 1, 1922	Rainier, 26	1½	2490	...	...	July 5, 1922	Steinmetz-Elec.—15 ..	¾	2575	...	...
	Rainier, 28	2-2½	2890	2950	160	July 5, 1922	Steinmetz-Elec.—15 ..	¾	2635	...	...
	Rainier, 20	2½-3	3550	...	...				
	Rainier, 15	3*-5	4400	...	...				
	Rainier, 17	6	5100	...	...				
	Ranger	1½	2450	...	...				
Aug. 25, 1922	R. & L.—B12—Taxi..	...	...	2350	...						
Aug. 25, 1922	R. & L.—B12—Taxi..	...	...	2475	...						
	Reo F	¾-1½	1245	...	...				
	Republic 75 Rap. Tran	¾	...	1395	...						
	Republic 10	1	1395	...	...	May 24, 1922	Stewart, 15	1½-1½	1875	1445*	430
	Republic 10 Exp	1	1795	...	...	May 24, 1922	Stewart, 9	1½-2	2200	1790	410
	Republic 11X	1½-2	1795	...	...	May 24, 1922	Stewart, 7	2-2½	2800	2190	610
	Republic 19	2½-3	2195	...	...	May 24, 1922	Stewart, 7X	2½-3	2950	2390	560
	Republic 20	3½-4	3095	...	...	May 24, 1922	Stewart, 10	3½-4	3850	3190	660
Aug. 15, 1922	Revere	1	1380	1295	85	May 24, 1922	Stewart, 10X	3½-4	3850	3190	660
April 20, 1922	Reynolds, 3A	2	3400	2000	1400						
April 20, 1922	Reynolds, 5A	4	3800	2800	1000	March 20, 1922	Stoughton C	¾	1240	...	...
April 20, 1922	Reynolds, 22C—Bus..	...	...	5500	...	March 20, 1922	Stoughton F	1	1995	1790	205
	Rowe CW	1½	3000*	...	...	March 20, 1922	Stoughton B	1½	2350	2150	200
	Rowe C. D. W.	2	3300	...	...	March 20, 1922	Stoughton D	2	2800	2490	310
	Rowe G. S. W.	3	4150	...	...		Stoughton E	3	3600	3150	450
	Rowe G. P. W.	3	5250*	...	...	July 1, 1922	Sullivan—K	1½	...	2500	...
	Rowe HW	4	4500	...	...	July 1, 1922	Sullivan—E	2½	3350	2800	550
	Rowe F. W.	5	4850	...	...	July 1, 1922	Sullivan—H	3½	4650	3750	900
Feb. 1, 1922	Ruggles	1	...	1195	...	April 1, 1922	Thomart	1	1995	1795	200
Feb. 1, 1922	Ruggles	2	...	1795	...						
June 1, 1922	Sandow, CG	1½-2	...	1795	...	Jan. 1, 1922	Tiffin, GW	1½-2	2400	2100	300
June 1, 1922	Sandow, CG	1½-3½	...	1895	...	Jan. 1, 1922	Tiffin, MW	2½-3	3100	2700	400
June 1, 1922	Sandow, J	2½-3½	...	2750	...	Jan. 1, 1922	Tiffin, PW	3½-4	4100	3600	500
June 1, 1922	Sandow, M	3½-5	...	3750	...	Jan. 1, 1922	Tiffin, TW	5-6	4800	4300	500
June 1, 1922	Sandow, L	5-7	...	4325	...	Jan. 1, 1922	Tiffin, UW	6-7	5000	4500	500
	Sanford 15	1½	2150	...	...	May 26, 1922	Titan	2	...	2750	...
	Sanford 25	2½	3350	...	...	May 26, 1922	Titan	2½	3400	2950	450
	Sanford 35	3½	4200	...	...	May 26, 1922	Titan	3½	4550	3950	600
	Sanford 50	5	5100	...	...	May 26, 1922	Titan	5	5400	4550	850
	Schacht	2	3200	...	...	July 17, 1922	Tower	1½	2900	2000	900
	Schacht	3	3800	...	...	July 17, 1922	Tower	2½	3200	2475	725
	Schacht	4	4200	...	...	July 17, 1922	Tower	3½	4100	3475	625
	Schacht	5	4400	...	...	Jan. 1, 1922	Transport 15	1	1395	1295	100
	Schacht	7	5050	...	...	Jan. 1, 1922	Transport 25	1½	1995	1495	500
June 1, 1922	Schwartz	1	...	1685	...	Jan. 1, 1922	Transport 35	2	...	1855	...
June 1, 1922	Schwartz	2	...	3000	...	Jan. 1, 1922	Transport 55	3	...	2385	...
June 1, 1922	Schwartz	3	...	3600	...	Jan. 1, 1922	Transport 60	3½	3885	2555	1300
June 1, 1922	Schwartz	5	...	4900	...	Jan. 1, 1922	Transport 75	6	...	3485	...
Jan. 3, 1922	Selden Unit No. 30...	...	2360	2250	110						
Jan. 3, 1922	Selden Unit No. 50...	...	3425	3250	175						
Jan. 3, 1922	Selden Unit No. 70...	...	4175	3750	425						
Jan. 3, 1922	Selden Unit No. 90...	...	5600	4950	650						
Jan. 3, 1922	Sel. U. No. 31 Motorbus	...	...	3350*	...						
Jan. 3, 1922	Sel. U. No. 51 Motorbus	...	...	4350*	...						
Jan. 1, 1922	Seneca	¾	920	820	100						
Aug. 1, 1922	Signal	1	1950	1450*	500						
Aug. 1, 1922	Signal	1½	2450	1950	500						
Aug. 1, 1922	Signal	2½	2875	2375	500						
Aug. 1, 1922	Signal	3½	3675	3175	500						
Aug. 1, 1922	Signal	5	4400	3900	500						
	Southern, 10	1	2090	...	...				
	Southern, 15	1½	2590	...	...				
	Southern, 16	1½	2790	...	...				
	Southern, 20	2	2990	...	...				
Aug. 15, 1922	Standard 75	1½	1330*	...	...				
	Standard I-K	1-1½	1600	...	...				
	Standard 76	2½-3½	2400	...	...				
	Standard 66	3½-5	3150	...	...				
	Standard 5-K	5-7	4400	...	...				
	Standard—75—Bus ..	...	2550*	...	...				
Aug. 15, 1922	Star—Delivery .....	...	...	610	...						
July 5, 1922	Steinmetz-Elec.—15 ..	¾	...	3365	...						
July 5, 1922	Steinmetz-Elec.—15 ..	¾	...	2585	...						
July 5, 1922	Steinmetz-Elec.—15 ..	¾	...	2255	...						
July 5, 1922	Steinmetz-Elec.—15 ..	¾	...	2315	...						
July 5, 1922	Steinmetz-Elec.—15 ..	¾	...	3705	...						
July 5, 1922	Steinmetz-Elec.—15 ..	¾	...	2925	...						
July 5, 1922	Steinmetz-Elec.—15 ..	¾	...	2595	...						
July 5, 1922	Steinmetz-Elec.—15 ..	¾	...	2655	...						
	Sterling	1½	2885	...	...				
	Sterling	2	3085	...	...				
	Sterling	2½	3290	...	...				
	Sterling	3½	4325	...	...				
	Sterling 5W	5	4950	...	...				
	Sterling, Cont. Special	...	4990	...	...				
	Sterling 5C	5	5500	...	...				
	Sterling	7½	6000	...	...				
	Sterling—Bus .....	...	2865	...	...				
	Sterling—Bus .....	...	3290	...	...				
	Stoughton C	¾	1240	...	...				
	Stoughton F	1	1995	1790	205						
	Stoughton B	1½	2350	2150	200						
	Stoughton D	2	2800	2490	310						
	Stoughton E	3	3600	3150	450						
	Sullivan—K	1½	...	2500	...						
	Sullivan—E	2½	3350	2800	550						
	Sullivan—H	3½	4650	3750	900						
	Thomart	1	1995	1795	200						
	Tiffin, GW	1½-2	2400	2100	300						
	Tiffin, MW	2½-3	3100	2700	400						
	Tiffin, PW	3½-4	4100	3600	500						
	Tiffin, TW	5-6	4800	4300	500						
	Tiffin, UW	6-7	5000	4500	500						
	Titan	2	...	2750	...						
	Titan	2½	3400	2950	450						
	Titan	3½	4550	3950	600						
	Titan	5	5400	4550	850						
	Tower	1½	2900	2000	900						
	Tower	2½	3200	2475	725						
	Tower	3½	4100	3475	625						
	Transport 15	1	1395	1295	100						
	Transport 25	1½	1995	1495	500						
	Transport 35	2	...	1855	...						
	Transport 55	3	...	2385	...						
	Transport 60	3½	3885	2555	1300						
	Transport 75	6	...	3485	...						
	Traylor B	1½	2390	...	...				
	Traylor C	2-3½	2850	...	...				
	Traylor D	3-3½	3300	...	...				
	Traylor F	5-6	4700	...	...				
	Triangle, AA	1	...	1285	...						
	Triangle, A	1½-2	...	1985	...						
	Triangle, C	2-2½	...	2285	...						
	Triangle, B	2½-3	...	2585	...						
	Twin City	2	2750	...	...				
	Twin City	3½	3950	...	...				
	Union—FW	2½	3490	3150	340						
	Union—FW	2½	3565	3225	340						
	Union—HW	4	4650	3975	675						
	Union—HW	4	4675	4000	675						
	Union—H	4	...	3975	...						
	Union H	4	...	4000	...						
	Union—JW	6	...	5800	...						
	Union—Bus .....	...	...	7200	...						
	Union—Bus .....	...	...	7550*	...						
	United A	1½	2445	...	...				
	United B	2½	3150	...	...				
	United C	3½	3975	...	...				
	United V	5	5000	4500	500						
	Velle 46	1½	2200	1585	615						
	Vim 50	½-¾	...	995	...						
	Vim 50—Express	½-¾	...	1185	...						
	Vim 50—Panel	½-¾	...	1210	...						
	Vreeland, A	2	3200	3150	50						
	Vreeland, AJ	2	3250	3200	50						
	Vreeland, AJL	2	3300	3250	50						
	Vreeland, B	3	3750	3700	50						

Date	Trucks	Tons Capacity	Old Price	New Price	Dec. Inc.
Jan. 1, 1922	Walker-Electric	1 1/2	2100	2000	100
Jan. 1, 1922	Walker-Electric	1	2500	2275	225
Jan. 1, 1922	Walker-Electric	2	3000	2750	250
Jan. 1, 1922	Walker-Electric	3 1/2	4100	3750	350
Jan. 1, 1922	Walker-Electric	5	4500	3950	550
March 1, 1922	Walker-Johnson Ajax	...	2000	1750	250
March 1, 1922	Walker-Johnson A	...	2500	2250	250
March 1, 1922	Walker-Johnson B	...	3500	2750	750
Feb. 20, 1922	Walker-La F. 2B..2 1/2-3 1/2	...	3590	2990	600
Feb. 20, 1922	Walker-La F. 4A..3 1/2-5	...	4690	3990	700
Feb. 20, 1922	Walker-La F. 5A.. 5-7	...	5590	4590	1000
Aug. 1, 1922	Walter	2	3750	3500	250
Aug. 1, 1922	Walter	2 1/2	3850	3700	150
Dec. 9, 1921	Walter	3 1/2	...	4550	...
Dec. 9, 1921	Walter	5	5600	4850	750
Dec. 9, 1921	Walter	7	...	5350	...
March 15, 1922	Ward, WS-2—Electric	...	1495	1345	150
March 15, 1922	Ward, WA-2—Electric	...	...	1895	...
March 15, 1922	Ward, WA—Electric..	...	2085	1945	140
March 15, 1922	Ward, WB-2—Electric	...	...	2295	...
March 15, 1922	Ward, WB—Electric..	...	2475	2355	120
March 15, 1922	Ward, WD-2—Electric	...	...	2765	...
March 15, 1922	Ward, WD—Electric..	...	2975	2835	140
March 15, 1922	Ward, WF-2—Electric	...	...	3750	...
March 15, 1922	Ward, WF—Electric..	...	3950	3830	120
March 15, 1922	Ward, WH-2—Electric	...	...	4560	...
March 15, 1922	Ward, WH—Electric..	...	4650	...	...

Date	Trucks	Tons Capacity	Old Price	New Price	Dec. Inc.
July 25, 1922	Watson, B	1	1965	1465	400
	Watson, M	1	4250	...	...
	Watson, U-Tractor	1	4050	...	...
	White 15	1 1/2	2400	...	...
	White 20	2	3250	...	...
	White 40	3 1/2	4200	...	...
	White 45	5	4500	...	...
	White—Bus	...	4400	...	...
April 1, 1922	Wichita, K	1	2300	1875	425
April 1, 1922	Wichita, M	2	2800	2400	400
April 1, 1922	Wichita, R	...	3600	3200	400
April 1, 1922	Wichita, O	4	4000	3500	500
	Wilcox	1	1900	...	...
	Wilcox	1 1/2	2550	...	...
	Wilcox	2 1/2	3000	...	...
	Wilcox	3 1/2	3950	...	...
	Wilcox	5	4350	...	...
	Wilson F	1 1/2	2270	...	...
	Wilson E A	2 1/2	2825	...	...
	Wilson G	3 1/2	3685	...	...
	Wilson H	5	4520	...	...
Jan. 1, 1922	Yellow Cab	1 1/2	2050	1590	460
Jan. 1, 1922	Yellow Cab	1 1/2	2850	1640	710

J. T. CROSSLAND HEADS NEW SIGNAL BRANCH.

DETROIT, Oct. 14.—President M. B. Hoagland of the Signal Truck Corporation announces the opening a direct branch at 431 North Capitol avenue, Indianapolis, Ind. The management of this branch has been placed in the hands of J. T. Crossland, who has served as district manager for a long period. Complete sales and service equipment has been installed and Mr. Hoagland feels that the already well established Signal business in that territory will be greatly benefited by this move.

WHITE ISSUES STATEMENT OF CONDITIONS.

CLEVELAND, Oct. 14.—The following is a copy of a notice that has been mailed the stockholders of the White Motor Company:

Sept. 30, 1922.

To the Stockholders:—

The enclosed check is in payment of dividend No. 27 on White motor stock at the rate of \$1 per share quarterly. Similar dividends have been paid without interruption every quarter since the company was organized.

The earnings from Jan. 1 to Aug. 31 have comfortably exceeded dividend requirements for the entire year, and the volume of orders on hand and in prospect indicate a continued improvement in our business. The ratio of our current assets to current liabilities is now five to one. Our outstanding loans are only \$500,000, and we have not discounted any of our customers' paper.

We are employing 3776 men in the factory and are producing on a basis of 10,000 trucks a year.

On Sept. 1 our general offices were moved from Euclid avenue to the plant, and all offices are now located in one building, which greatly facilitates the

prompt and economical handling of our business.

The constantly recurring rumors of a proposed consolidation of this company with one or more other companies are without foundation in fact. It is the present judgment of your directors that a consolidation would not benefit this company.

BENTON HOPKINS GOES WITH RACKLIFF.

NEW YORK, Oct. 10.—Benton Hopkins, formerly advertising manager of Denby Motor Truck Company, Detroit, and previous to that associated in an advertising capacity with other automotive manufacturers, has joined the H. L. Rackliff Company, automotive marketing counselors of Cleveland and New York.

Mr. Hopkins will be associated with the Rackliff organization as advertising counselor.

FOURTH ANNUAL SHOW OF THE AUTOMOTIVE EQUIPMENT ASSOCIATION.

THE A. E. A. will hold its Fourth Annual Show at the Coliseum in Chicago the week of Nov. 13 to 18 inclusive.

The show this year is to be a closed show, which means that it will be for the members of the association only, and that is, that the manufacturing members will be the only ones permitted to display their exhibits and the jobbing members will view same. No manufacturers or jobbers not connected with the association will be able to take part in the exhibit.

This is a new feature and up to the present time 265 spaces have been allotted for 212 exhibitors.

TRANSPORT GOES THROUGH DESPITE BAD ROADS.

TAMPA, FLA., Oct. 11.—How motor trucks are negotiating greater distances under the most adverse conditions is well illustrated by C. W. Bruce's report of a recent trip of the Rapid Transit truck from this city to Ft. Myers, Fla., 177 miles.

The roads from Tampa to Punta Gorda are good, but from Punta Gorda to Ft. Myers, 42 miles, is one of the worst stretches in the state.

The Rapid Transit is a 2000-pound job for fast delivery, manufactured by the Transport Truck Co., Mount Pleasant, Mich. When it reached Punta Gorda the men in charge were advised not to attempt the rest of the trip by truck, as two weeks of heavy rains had made the road impassable. The Transport men went on in the truck. On the way they found nine cars and trucks stuck and abandoned by drivers. The Rapid Transport pushed right along and the entire trip was completed in 12 1/2 hours for the 177 miles. The gasoline consumption for that mileage was 11 gallons, a little more than 16 miles to the gallon. The purchaser was so astonished that he insisted on leaving the mud on the truck for exhibition. It was a hard test of the roadability of the truck and splendid evidence of the power and dependability that is being built into transportation by gasoline these days.

INDIANA TRUCK PAYS REGULAR DIVIDEND.

MARION, IND., Oct. 11.—The directors of the Indiana Truck Corporation have declared their regular quarterly dividend No. 23 of 1 1/2 per cent. on the preferred stock of the corporation, payable Oct. 1, 1922, to stockholders of record Sept. 30, 1922.

Public Motor Transportation Universal in Scope

THE popularity of motor buses and taxicabs is increasing to such an extent that the market derived from the demand for such vehicles promises to become a vitally important outlet for automotive products, states a communication from the Department of Commerce.

The scope of this part of the automotive market has been generally underrated in the past, partly because it has been considered in the light of the attendant demand for fare registers and accessories, whereas it should be looked upon as a field for extensive replacements that are certain to follow the daily use of the motor bus or taxicab with their constant exposure to the wear and tear of street traffic and frequent stops.

Taxicab and bus transportation being of comparatively recent date, the replacement market has not yet attained the significance it will have a few years hence when the original equipment will have to be discarded.

THE world-wide growth of public automotive transportation reflects itself in a steadily increasing flow of reports dealing with this topic which are received alike from countries with a highly developed transportation system, such as England, and from relatively unpopulated and undeveloped areas, such as the Near East. The foregoing is substantiated by the following articles which have reached the automotive division in the course of one week:

Autobuses Competing with Trolley Cars at Geneva.

Geneva is the first Swiss city to carry extensive plans for the adoption of autobuses. A company has been formed for the purpose of operating three lines, the concessions for which, it is anticipated, will be granted shortly. The cars for the new bus lines will be similar to those used in Paris, but somewhat smaller, and equipped with pneumatic tires; including the rear platform, each will have a capacity for 35 passengers. The buses will be furnished by the Saurer Company of Arbon.

The introduction of bus lines is apparently not so much a response to needs for more extensive transportation facilities as a venture in underselling the tram lines, 15 of which constitute the present system, embracing a length of 119 kilometers. The rates announced by the bus company are appreciably lower than those of the trams, the charge for any distance of less than one kilometer (0.62 mile) being 10 centimes (1.93 cents), while on one of the routes—a belt line five kilometers long—there will be a fixed charge of 20 centimes (3.86 cents),

regardless of the distance traveled. The general basis for long distances on other routes is 12 centimes per passenger-kilometer (3.71 cents per passenger-mile, under normal rates of exchange).

This new project is being launched in spite of the fact that the city tramways closed the fiscal year of 1921 with an operating loss of 61,846 francs. (Consul Lewis W. Haskell, Geneva, Switzerland, Sept. 4.)

Motor Buses Superseding Taxicabs in Aden.

The conversion of taxicabs into buses in Aden, Arabia, is an unusual development as the result of a recent ruling compelling taxi drivers to assemble their cars in certain prescribed taxi stations, there to wait for passengers and to leave in order of priority, instead of running up and down the streets soliciting business, as heretofore.

This ruling has cut down the daily income of taxicab drivers materially, as there are only three stations in the city at present and the number of cars waiting at any station is considerable. To make matters worse for taxi drivers there are several automobile trucks following a more or less fixed schedule and route, to whom the ruling does not apply. These buses carry three to four times as many passengers at about one-half the rate of the taxis, and are very popular since most of the natives in Aden are of limited means.

After an unsuccessful appeal to the authorities, taxicab drivers started about one month ago to change their cars into buses, of which there are now six in running

order and several more in the course of construction. The bodies to fit the buses are made locally and at a comparatively low price. The four Berliet buses, having a carrying capacity of from 15 to 50 people each, and eight American cars of well known make, converted into buses carrying from nine to 15 people each, are doing a remunerative business; but the smaller unconvertible cars are having hard times, and many of them undoubtedly will be forced out of service—much to the dissatisfaction of Europeans and the better-off natives, who do not care to ride in buses.—(Consul Raymond Davis, Aden, Arabia, Aug. 12.)

Motor Buses for Melbourne.

Owing to the congested condition of traffic in the central sections of the city of Melbourne, Australia, it has been proposed that motor buses, similar to those used in London, be put in service at the earliest possible moment. An investigation into the desirability of this innovation, however, discloses that, notwithstanding the advantages of bus transportation and in view of the excellency of the city's tramway system, it would be more expedient to defer the proposed service until the city has a population of 1,000,000, the present number being between 700,000 and 800,000.—(Melbourne Argus, Aug. 3; reported by Consul General Thomas Sammons.)

Motor Buses Versus Railways in Damascus.

Bus transportation in the Damascus region has increased very much in importance during the past six months. Three companies are now operating on the route from Damascus to Beirut, over which the bulk

of traffic is moved. The largest company, owning the Beirut-Damascus railroad, up to a short time ago was charging three Syrian pounds (\$5) for a third-class railway ticket to Beirut (86 miles by rail); but as the same trip could be made in about half the time in an autobus for two Syrian pounds (\$3.30) the business of the railway company fell off alarmingly and did not improve when the price of a third-class ticket was decreased to 2.10 Syrian pounds (\$3.45).

As a result the railway company inaugurated a motor bus service of its own, which has taken the lead in size and comfort of cars and cheapness of rates, the price of a ticket being now 1.25 Syrian pounds (\$2.05). While it is alleged that the company is operating at a loss in order to drive its competitors out of business, it is believed, on the other hand, that the attractive rates are due to the fact that the company is operating several other motor bus lines in Syria and is simply giving

the public the benefit of large-scale operations.—(Consul Charles E. Allen, Damascus, Syria, Aug. 15.)

Motor Buses Cut Profits on London Street Railways.

The fares charged by the street railways in London, Canada, until the spring of 1922 were regarded as lower than elsewhere in Canada or the United States. Although the fares were raised somewhat in the spring, this increase did not result in any profit to the street railway companies because of the motor bus operation which began at about that time.

The bus rates are somewhat lower than those of the street railways,, although the former pay to the city a license fee of \$100 for each bus, and are compelled to take out a liability insurance to cover payment of damages for injuries to persons or property. Although the buses are making money at the present time, it is asserted that in view of the depreciation of approximately \$1 a day for each \$1000 value in the bus, the

profits will be considerably reduced by the costs of increased repairs and depreciation as the vehicles grow older.

The advocates of bus transportation claim the following advantages for motor buses:

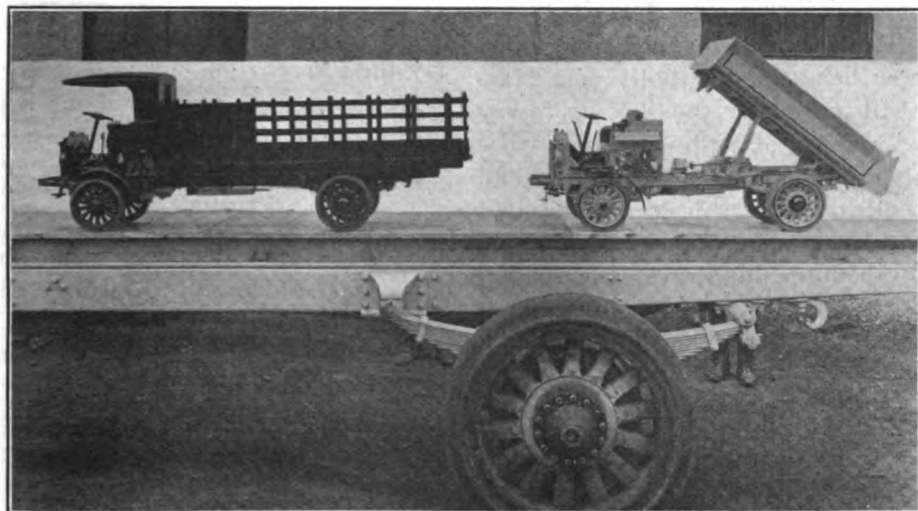
Passengers are in less danger of being run down by the regular street traffic, because the buses stop at the curb. Street congestion is relieved, because no traffic is held up while the passengers are getting on and off. The buses can be used successfully during fires, parades, breakdowns and other street blockades by diverting the route for short distances.

The noise of flat steel wheels is eliminated. A network of wires on main streets and costly track extensions are not necessary for buses. Electric storms, high winds, power house trouble, etc., do not affect buses as much as street cars.

Buses can give short-cut service between factory and residential districts for workmen at rush hours, thus avoiding the transfer of large masses of rush-hour riders at downtown transfer points. They can give immediate service on new lines when there is a demand therefor, thus showing quickly whether a new line is necessary, and can discontinue this new route if unprofitable. They can give fast service, with extra buses at rush hours, by eliminating stops at important street intersections. They need not run empty over a long distance, because switchbacks can be arranged.

Buses do not harm the streets noticeably, because the traffic is distributed over the entire surface of the pavement, while the street car road bed is constantly out of repair. The constant drain on hydroelectric power sources for street car operation is eliminated when buses are used.—(Consul G. R. Taggart, London, Ontario, Canada, Aug. 22.)

Smithsonian Gets Auto Car Models



The Autocar Company Finds Particular Satisfaction in This Its Quarter Century Year Because the Remarkable Economy Record, Established by the Five-Ton Heavy Duty Autocar, Has Caused Impartial Experts at the Smithsonian Institution, in Washington, D. C., to request Models for Permanent Exhibition in the Smithsonian Transportation Section.

Two Quarter-Size Models Have Been Made at the Autocar Factory and Will Be Delivered to the Smithsonian Institution as Soon as They Have Been Entirely Completed. It Will Be Recognized That the One Showing a Rack Body Is a Model of the 156-Inch Wheelbase Type, While the Other Is the 120-Inch Wheelbase Type. The Latter Is to Be Mounted with a Complete Rotary Dump Mechanism and Body Which Will Elevate and Lower Exactly the Same as in the Full Size Trucks.

The Photographs Indicate Clearly That the Quarter-Size Senie Has Been Adhered to in Every Detail. In Fact, These Two Models Are Real Motor Trucks, Not Something Put Together to Show What a Quarter-Size Motor Truck Would Look Like. It Is, of Course, Not Intended to Operate Them with Gasoline but a Small Electric Motor Will Enable Them Otherwise to Operate Completely, Including Shifting Gears.

All of the Operations Essential in Constructing a Full-Size Truck Were Necessary in the Case of These Models, Beginning with Mechanical Drawings and Patterns and Ending with Castings and Assembling. These Models Were Assembled by Mr. John Bergner, an Employee of Long Standing with the Company.

FORD MOTOR CO. OF CANADA TO BUILD ADDITION.

FORD, ONT., CANADA, Oct. 10.—Ford Motor Car Company of Canada has announced that \$6,500,000 will be spent on an addition to the factory to be used as a machine shop.

Milk Distribution by Truck Now Nation Wide

A NATION-WIDE movement favoring milk distribution by motor trucks is now in progress. Reports reaching here today show that Cincinnati now receives 97 per cent. of its daily milk supply by trucks; Atlanta, 90 per cent.; Kansas City, 40 per cent.; Milwaukee, 65 per cent.; Los Angeles, 90 per cent.; Philadelphia, 64,169 quarts. At one of the principal creameries in Detroit over 9,000,000 gallons of milk were received last year by trucks.

Preliminary conferences to aid the movement along economical lines are now in progress in Philadelphia and Washington. A report on country wide distribution of milk has been submitted for use in these meetings by the National Motor Truck Committee, National Automobile Chamber of Commerce, to the National Milk Producers' Federation of Washington, which is composed of over 200,000 producers.

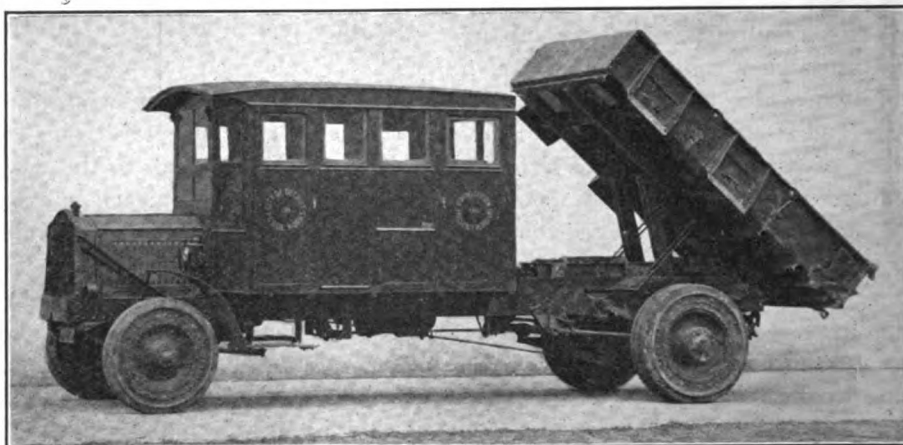
This report showed graphically that truck distribution through suburban areas within a radius of from 30 to 50 miles is more satisfactory and economical than other methods of distribution. With the possible exception of New York, Chicago and Philadelphia, the opinion was expressed that producing areas are not located so distant from distribution points that trucks cannot be used in this manner.

In Milwaukee it was shown that 65 per cent. of the 30,000 gallons of milk shipped into the city daily arrives in trucks at an annual saving of \$17,812. In addition to this the milk dealers reported that they could handle the milk five cents a can cheaper when the milk is brought to

them by trucks from the farms than by any other means.

In the retail delivery phase the case was cited of a prominent milk company that motorized its delivery service, 44 trucks replacing 54 retail horse-drawn vehicles at an estimated saving of \$24,000.

EQUIPPED FOR WINTER WEATHER



Detroit Provides Ample Comfort for Highway Workers with This Truck, Which Combines Protection with Plenty of "Elbow Room."

FIFTH AVENUES OF AMERICA.

(Continued from Page 540.)

Replacements on Fifth avenue are now being made wholly of the asphalt mixtures, thus doing away with the rigid method. In the earlier stages the combination of Portland cement concrete base and asphalt top was regarded as too expensive for country highways, but the increasing motor truck traffic necessitated thickening and widening by

addition of cement of the unsurfaced slabs and the use of re-enforcing metal so that today it is possible to lay the combination city type or the re-enforced rigid type at about the same cost.

RECOMMENDS TRAFFIC REGULATIONS.

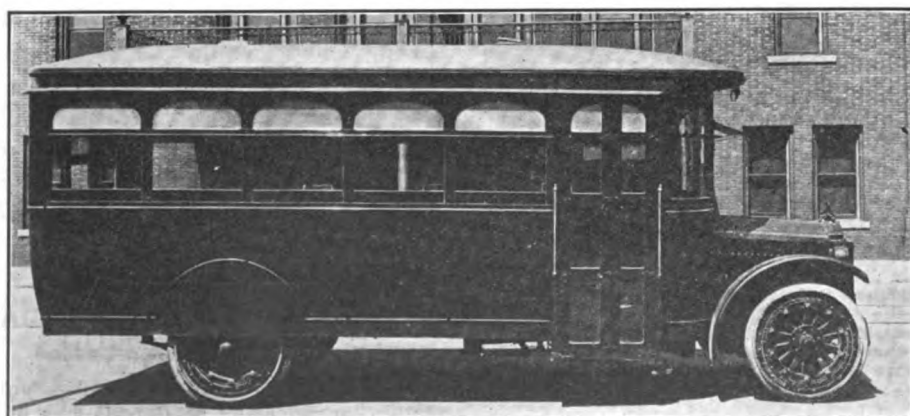
(Continued from Page 529.)

the signal is given for the traffic to move in the direction toward which the pedestrians are crossing.

Pedestrians shall not cross street intersections diagonally, but they shall cross only one street at a time using a crosswalk, if designated, or otherwise shall cross at right angles with the street.

Pedestrians crossing the street in the congested district or the business district or crossing any main thoroughfare, shall do so only at street intersections or cross walks. Pedestrians crossing any street at a point other than a street intersection or cross walk outside of the congested district or business district or main thoroughfares shall exercise due diligence for their own protection and safety.

A PRACTICAL BUS JOB



This Nelson Bus Is Well Planned to Give Maximum Service and the Utmost in Passenger Comfort. Note Enclosed Rear Wheel.

Sale of Motor Trucks in Boston Gaining Say Dealers

**All Conditions Point to 1923 Being Banner Year—"Stigma Taxes"
Condemned by Distributors—Service to Vehicle Owners
Occupies Attention of Trade.**

(Special to Motor Truck.)

BOSTON, MASS., Oct. 9.—Dealers through this section of the country and the East as a whole are especially enthusiastic over business conditions and state that there is every reason to look for increasing motor truck business for the next two months. Unemployment is at the lowest level since the war and there are other trade barometric indications that point to 1923 being a banner year, although at the present time there is some unrest due to rising prices in certain raw materials which, it is feared, may slow up general business. Thus far the fall season has been particularly auspicious, building is going forward and highway construction, because of the very good weather, has not been materially halted, all of which has aided the business appreciably.

It has not generally been mentioned in the news columns of local papers, but the fact of the matter is that the very uncertain conditions prevailing throughout all railroad lines have caused many shippers to turn to the motor truck for the delivery of goods between cities and this is especially true with regard to haulage from tidewater into the interior of New England.

The situation is not improved to a point where it approaches that of 1919, but nevertheless is much better than a year ago at this time and there has been a renewal of confidence all along the line which assures those in close touch with the industry of steadily increasing trade. Mills which a year ago were not turning a wheel are now almost without exception going full blast and here the motor truck has benefited; freight shipments formerly carried by interurban trolley have not been satisfactorily handled and many motor trucks are being used in this class of business.

The unfortunate fact is noted, however, and has been much commented on that service to motor truck owners during the last 12 months has had a tendency to revert to a condition similar to that of the pioneer days of the industry and

there has been no little comment on the fact by large and small truck fleet operators.

This particular phase of the matter, according to men in close touch with the business, needs immediate attention if the truck is to continue to establish new records of progress, but it is confidently believed now that business has shown a turn for the better, that the problem will automatically settle itself.

Dealers almost without exception state that in their opinion the discriminatory "stigma" taxes on the sale of motor trucks which were put in effect shortly after the start of the world war should be appealed and there has been no little bitterness expressed over a condition which, retired from such items as sporting goods, perfume and chewing gum, should still obtain in the case of motor trucks which they feel are to be numbered among the necessities of business life in every city. It is understood that a movement is soon to be started to endeavor to remove these discriminatory taxes, following which it is believed that at least one of the material factors that go to make for sales resistance will be lessened.—L. McD.

MOTOR TRUCK CENSUS SHOWS BIG GAIN.

WASHINGTON, Oct. 9.—According to the Bureau of Public Roads of the United States Department of Agriculture, motor trucks registered July 1 totaled 1,096,605 out of a total registration of 10,620,471, which is an increase of 157,176 over previous figures.

MACK MOTORS PRODUCES 500 TRUCKS MONTHLY.

YORK, PA., Oct. 11.—Mack Motors, Incorporated, according to a recent statement, has a present production of better than 500 trucks monthly. According to statement issued by the company the last

nine months ending Oct. 30 will show a profit of nearly \$3,000,000. Since the company put into production its two new rail cars, the smaller of which sells for \$8500 and the larger at \$16,000, business has been especially good and there appears to be no reason to believe that it will slacken materially.

In the development of the motor bus for electric and steam railways the company has been very successful and has several installations running at the present time, all of which emphatically prove the greater economy of the motor bus over the electric car or steam passenger train.

NORTHERN JOBBING CO. BUYS TRUCK FLEET.

CHICAGO, ILL., Oct. 11.—The Northern Jobbing Company, wholesale grocers of long standing in this city, following troubles incidental to delivery during the railroad strike, has purchased a fleet of motor trucks and finds that the average cost per mile for operation as shown by carefully compiled figures is 50 per cent. less than the average rail shipment for the last four years. The trucks used by this concern, which handles light material for the most part, will be of the $\frac{3}{4}$ to one-ton type.

WHITE HAS NO INTENTION OF MERGING INTERESTS.

CLEVELAND, O., Oct. 11.—The White Motor Company, regarding which certain rumors from time to time have been afloat as to a proposed merger for consolidation with other companies announces that there is no intention on the part of this manufacturer to consolidate and that any reports to that effect are without foundation or fact, as in the present judgment of the directors the company would not be benefited by such action.

F. F. MARTIN GOES TO FAGEOL MOTORS CO.

OAKLAND, CAL., Oct. 11.—Sales Manager F. F. Martin of the Sheldon Axle and Spring Company will leave his present position Dec. 31st, having accepted the position of eastern district representative of Fageol Motors Company of this city. Mr. Martin states that in his opinion the bus business has a great future and believes that by identifying himself with this progressive company he has enhanced his opportunities.

ELECTRIC TRUCK ASSOCIATION WANTS SLOGAN.

NEW YORK, Oct. 13.—A \$1000 prize for advertising slogans which will describe electric truck service in city hauling has been announced by the Electric Truck Association of this city. The conditions incidental to the offer state that no slogan may be more than 10 words and it must also be applicable in its entirety to the electric truck.



Because of Their Rugged Construction and General Dependability Atlas Trucks Have Found Favor with Contractors in All Lines of Work.

Strikes Delays Work on "Ideal Section"

Cessation of Material Shipments Holds Up Construction of Famous Piece of Road.

DETROIT, Oct. 14.—Progress in the construction of the Ideal Section of the Lincoln Highway has been materially delayed by the strike and the resulting cessation of material shipments, is the announcement made from the headquarters of the Lincoln Highway Association here.

This famous piece of road between Dyer and Schererville in Lake County, Indiana, the design and construction of which has probably received more thought and care than any other section of road in the world, is being built by the association to demonstrate what is believed to be the last word in modern, durable highway specifications for main routes of heavy travel. While the stretch is not long, being less than a mile and a half in length, it is being constructed with the utmost care and under the combined supervision of the Federal government, the State of Indiana and the Lincoln Highway Association. Every safeguard is being thrown around the work to the end that the completed paving may be in every respect, as perfect as modern highway engineering can produce. The work is therefore not being unduly rushed.

W. G. Thompson, consulting engineer for the Lincoln Highway Association and representing also its technical committee of highway engineers and other authorities, recently inspected the progress of the work, following the resumption of material shipments. Following a conference with C. Gray, state highway engineer of Indiana, and Albert Scott, vice president of Lockwood, Greene & Co. engineers, in charge of the work for the Lincoln Highway Association, he announced that no chances will be taken in laying any of the concrete pavement during cold weather. This means that the pavement will probably be completed from the west end of the section to the bridge this year, and the balance of the paving, toward Schererville, be postponed until spring. The old macadam now extending west of Schererville will not be torn up, so that traffic will meet with a minimum of inconvenience during the winter.

Both bridges are now rapidly nearing completion and the state has finished the 18 foot concrete road which will connect the west end of the Ideal Section with the Illinois state line. This section of paving was built to the usual state specifications, i. e., eight inches thick, without reinforcing.

The Ideal Section paving will be 40 feet wide on a 100 foot right-of-way and 10 inches thick, 80 pounds of reinforcing steel being imbedded in every 100 square feet. The state is paying as its share of the Ideal Section cost only the amount

WHERE THE TRUCKS ARE USED

THE tremendous growth of motor truck sales and how they are fast replacing the horse on the farms of the country is shown in figures announced by Vance Day, sales manager of the General Motor Truck Company.

"Today," Mr. Day says, "there are 139,169 motor trucks on 131,551 farms in the United States. The farmers of New York lead the country in the number of trucks with 9259 to their credit, while Pennsylvania is second with 9072 to their credit, and Iowa is third with 8910. Ohio ranks fourth with 7319."

Other states and the number of trucks owned in that territory follow:

Maine, 1120; New Hampshire, 717; Vermont, 616; Massachusetts, 3535; Rhode Island, 536; Connecticut, 1595; New Jersey, 3380; Indiana, 3671; Illinois, 6154; Michigan, 4886; Wisconsin, 4044; Minnesota, 3803; Missouri, 5059; North Dakota, 774; South Dakota, 4353; Nebraska, 6548; Kansas, 3928; Delaware, 304; Maryland, 2805; District of Columbia, 29; Virginia, 2544; West Virginia, 936; North Carolina, 2671; South Carolina, 1736; Georgia, 3145; Florida, 1617; Kentucky, 1538; Tennessee 1430; Alabama, 1180; Mississippi, 1005; Arkansas, 1027; Louisiana, 874; Oklahoma, 2155; Texas, 5399; Montana, 1225; Idaho, 837; Wyoming, 591; Colorado, 3016; New Mexico, 593; Arizona, 581; Utah, 572; Nevada, 174; Washington, 3371; Oregon, 1819; California, 6416.

it would pay for the usual state specification, i. e., \$33,000 per mile. The county has agreed to finance the cost of the bridge and culvert and the Lincoln Highway Association is providing the funds to meet the balance of the cost of the work—a special appropriation having been made to the association by the U. S. Rubber Company for this purpose.

The beautification of the right-of-way, details of lighting and other final touches under the direction of Mr. Jens Jensen, landscape architect of Chicago, will also be accomplished next spring.

GILLAM WITH SERVICE MOTOR TRUCK.



G. L. Gillam, Formerly Connected with the Sales Department of the International Harvester Company, Who Has Been Appointed Sales Manager of the Service Motor Truck Company.

FURNITURE MOVERS PLAN COOPERATIVE MOVEMENT.

CLEVELAND, O., Oct. 9.—Cleveland furniture men, members of the Cleveland Warehousemen's Furniture Association, at the recent monthly meeting held at

the Athletic Club, discussed the problem of long distance motor trucking of household goods and decided that a plan should be formulated whereby members would cooperate with one another and with storage executives in cities within a radius of 300 miles of Cleveland in the transporting of furniture over any of the routes leading to the various cities included in that radius.

W. W. Morse, Minneapolis, president of the American Warehousemen's Association, who addressed the meeting on the subject, stated that the motor truck will play a big part in the movement of household furniture in the future and urged that all warehousemen work together for material benefit.

MINNEAPOLIS HAULERS ADOPT NEW SCALE.

MINNEAPOLIS, MINN., Oct. 11.—At the regular meeting of the Transfer Men's Association held recently in this city a new schedule which materially advances the charge for motor truck haulage was adopted, covering loading and unloading. The schedules of prices follows: For one-ton trucks and Reos the charge for long distance hauling is 40 cents a mile, with \$7.50 additional for loading and unloading. A charge of 60 cents a mile with \$10 additional for loading and unloading will be made for 2-2½ ton trucks, while for 3½ ton trucks the charge of 70 cents a mile and \$10 for loading and unloading.

It was generally believed, states Secretary W. W. Babcock, that drivers and helpers should be paid on a commission basis as this would make for quicker return and thus making the service more efficient. It is understood in the case of long hauls lodging and meals will be furnished at the expense of the company and a number of firms present expressed their intention of trying out the new policy.

Charles F. Smith has joined the engineering department of the Sterling-Knight Motor Car Co., Cleveland. He was previously field salesman for the Barry-Case Co., Cleveland.

Chicago to Have Finest Bus Service in World, Says John Hertz

Well-Known Transportation Expert with C. A. McCulloch Takes Over Chicago Motor Bus Company and Starts Series of Extensive Improvements.

CHICAGO, ILL., Oct. 11.—A corporation headed by John Hertz, president of the Yellow Cab Company, and C. A. McCulloch of the Parmelee Company, has taken over properties formerly owned by the Chicago Motor Bus Company, and plans to extend superior bus service to every boulevard and throughout the residential district of the entire city. Incorporated for \$3,000,000 the firms plan to build a great many of the very finest type of vehicle, and it is expected soon to become an important factor in the business. According to a statement issued by the company it is prepared to obtain the services of the world's transportation experts and will meet all competition as to salaries in obtaining the men considered best fitted for the work.

Already, as an indication of its high purpose, the company has ordered all but six of the many vehicles now in use on the north side boulevards dismantled and will replace them with more modern equipment which is now in process of construction.

Mr. Hertz, in a recent statement, said that his first object would be to prove to the world that bus service in Chicago can be brought to the highest standard ever dreamed of in public transportation. A 10-cent fare is to be continued at the present time, although Mr. Hertz, in going over matters with Mayor Thompson, has promised that this fare will be lowered just as soon as the earning capacity of the company makes the step possible.

The Yellow Cab Company, according to Mr. Hertz, is in no way connected with the new company, which is composed of a group of business men who have organized the concern which is exclusive of any other business venture. According to a statement made by the company the new vehicles will use Continental motors and with this exception will be built entirely in the company's plant. So far as can be learned the personnel and plant of the present bus company will be made use of although there are other details in connection with the maintenance which may necessitate a slight change of this particular phase of the business, according to report.

TWIN CITY COMPANY CUTS TRUCK PRICE.

MINNEAPOLIS, MINN., Oct. 15.—The Twin City Company announces the following reductions in the price of Twin City motor trucks:

	Old Price	New Price
2-ton model	\$2750	\$2400
2½-ton model	3950	3500

The new price is effective at once.

Twin City motor trucks are a part of the Twin City line of power farming equipment, comprising tractors, threshers and trucks.

TOLEDO-COLUMBUS BUS LINE INCORPORATED.

TOLEDO, O., Oct. 12.—A bus line recently started between this city and Columbus covers the entire distance in six hours and a half, which compares favorably with the average train service given between these two cities. This line, which is exceedingly fast, uses specially built bodies and has an equipment equal to any of the several hundred lines registered in this state.

It is entirely probable, judging from statistics available, that no other state in the Union supports as many bus lines as does Ohio and this vast number (said to be in excess of 500) is being added to daily by new concerns which are going into the business.

The Utilitators' Commission states that the bus lines do not need a charter to operate in the state, but that they are subject to a fine of \$1000 a day in the event of operation without properly filing applications.

DISTRIBUTION OF MILK BY MOTOR TRUCKS.

SPRINGFIELD, MASS., Oct. 15.—Definite action on the milk transportation problem will be taken at the Sixth Annual Convention of the National Milk Producers' Federation, which will be held

in this city Nov. 9-10. Charles W. Holman, executive secretary of the association, states that transportation by fleets of motor truck will undoubtedly be the means arrived at for handling the situation.

It has been confidently stated that a fairly large proportion of the quarter million milk producers and consumers already are making use of the motor truck and it is believed that with the proper kind of educational campaign that will show the much greater efficiency and lowered expense consequent on the use of commercial vehicles, a much greater number will join the ranks of truck users.

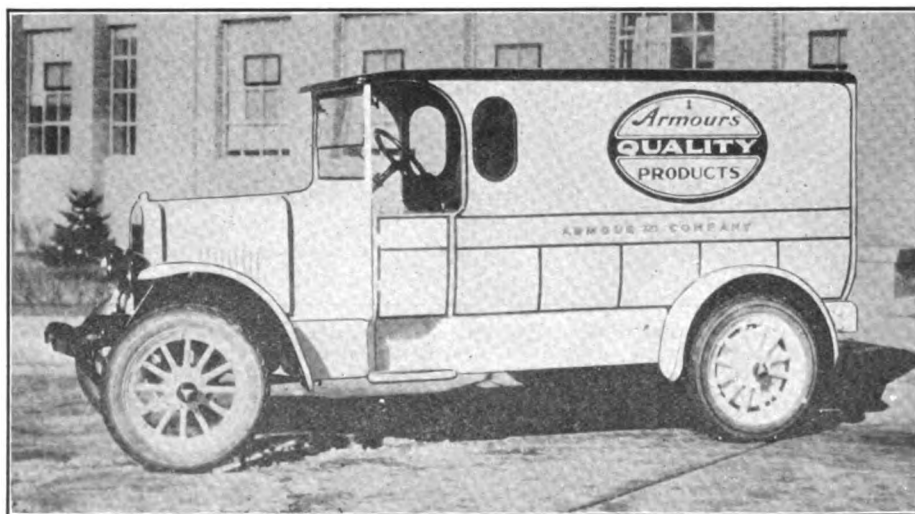
EPSTEIN COMPANY BUYS TRUCK FLEET.

MILWAUKEE, WIS., Oct. 13.—As the means of giving better service to its many customers the F. I. Epstein Company of this city recently has purchased 10 three-ton trucks which, known as the "Red Arrow Fleet," will be run on a schedule of deliveries and will, it is believed, materially better delivery conditions. Customers served by these trucks, which, it is stated, were named in honor of the 32nd division, were formerly served by the railway.

C. G. McDONOUGH BACK IN TRUCK SALES.

TOLEDO, O., Oct. 14.—C. G. McDonough, formerly of the Templar Motor Company, in charge of eastern sales and previous to that with the Clydesdale Motor Truck Company as district sales manager, is now with the Willys-Overland Company in charge of the taxicab and commercial car sales.

Lee L. Cass, who for the past year has been redesigning the gasoline locomotives built by the Cummings Machine Co., Minster, Ohio, and designing a complete new line of foundry equipment, has been appointed chief engineer of the Industrial Equipment Co., also located at Minster, which has succeeded the Cummings organization.



Type of Service Closed Delivery Car Used Extensively by Armour Packing Company for Distributing Goods to Local Merchants.

Arrangements Rapidly Being Made for Good Roads Show

Recent Activities Bring About Closer Cooperation and Build Working Organization That Assures Success of Important Event to Be Held Jan. 15-19.

NEW YORK, Oct. 11.—With the early start that was made during the summer through a partial reorganization and an election of officers in the American Road Builders' Association and the creation of the Highway Industries Exhibitors' Association to bring about closer cooperation, arrangements are rapidly being perfected for the 13th American Good Roads Congress and 14th National Good Roads Show to be held in Chicago, Jan. 15, 16, 17, 18 and 19, 1923.

The early beginning has enabled those in charge to perfect a working organization so harmonious and effective that conditions nearly 100 per cent. perfect are assured for the next big double event. While many of the most important features of both congress and show will be retained others both new and novel will be added.

It is the intention to separate the congress and show, by holding the former at the Congress Hotel and the latter at the Coliseum as usual. It is believed this arrangement will be more satisfactory, as it will obviate the necessity of shutting down the operating machinery during the sessions and will eliminate the noise that has proved so annoying to speakers and delegates at the conven-

tion. The new arrangement is also expected to increase the attendance at each session of the congress.

Shortly after his election, Thomas J. Wasser, president of the American Road Builders' Association for 1922-1923, appointed to the executive committee the following: Charles M. Upham, state highway engineer for North Carolina; James H. MacDonald, consulting highway engineer, New Haven, Conn., and J. H. Cranford of the Cranford Paving Company, Washington, D. C. By reason of his position as secretary, E. L. Powers became ex-officio a member of the committee.

This committee, acting for the A. R. B. A., appointed Messrs. Upham and MacDonald, and the Highway Industries Exhibitors' Association designated its president, S. F. Beatty, vice president of the Austin-Western Road Machinery Company of Chicago, to act as a committee having general charge of the arrangements for both the show and the congress. The committee is known as the convention and show committee.

This committee has now created several sub-committees to have charge of the various detailed arrangements as follows: Transportation committee, Royal

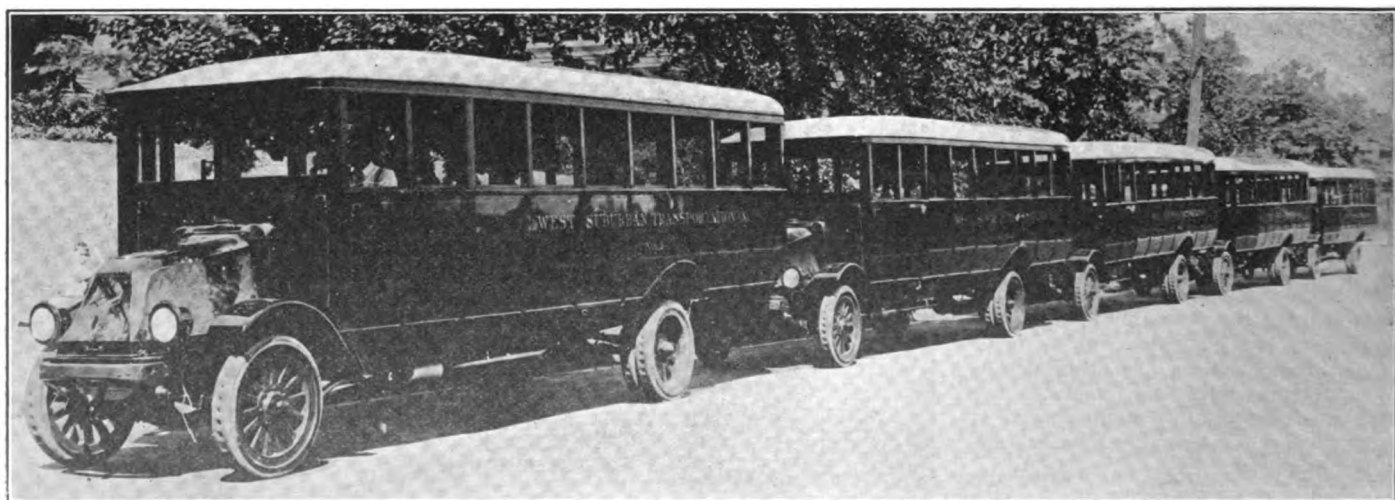
M. Allen, chairman; general publicity committee, S. T. Henry, chairman; Chicago press committee, W. R. Harris, chairman; exhibitors' committee, C. R. Ege, chairman; entertainment committee, A. C. Cronkite, chairman; reception and hotel committee, John B. Hittell, chairman; registration committee, L. S. Louer, chairman; banquet committee, Joseph R. Draney, chairman; programme committee, E. J. Mehren, chairman.

The exhibitors' committee has employed a professional director of exhibits in C. W. Kelley of Chicago, who, though never before identified with the road show, has managed some of the biggest expositions in the country, and the publicity committee has reengaged C. S. Lee of New York, who handled the publicity work for the shows and conventions in 1921 and 1922.

According to Chairman Upham of the convention and show committee, the chief difficulty will be encountered in providing space for all the exhibits, though arrangements will be made for all the additional space it is possible to obtain. "The Highway Industries Exhibitors' Association," said Mr. Upham, "is giving us splendid cooperation in working out the arrangements. We expect to conduct a publicity campaign of greater compelling force and more far-reaching effect than ever before and I believe the attendance at the event, because of this, will break all records.

The American Road Builders' Association has opened new offices at 37 West 39th street, New York City, the old ones at 11 Waverly place having been vacated. Headquarters will also be opened in Chicago long in advance of the congress and show.

International Buses Put to Severe Test



Six Hundred and One Miles Across Two Great States, Over All Kinds of Roads, and in Wet as Well as Dry Weather; That Was the Severe Test to Which Five Big New 5000-Pound Model 52 International Buses Were Subjected Before Being Turned Over to the Purchaser. The Trip from Omaha to Chicago Was Begun Saturday, Aug. 26, 7:30 P. M., and Was Concluded Thursday Afternoon at 4 P. M.

The Day Following Their Arrival in Chicago the Buses Were Turned Over to the West Suburban Transportation Company, Which Recently Obtained a Franchise from the Illinois Commerce Commission to Operate a Bus Line Between Cicero, Ill., and Hinsdale, Ill., Thriving Suburbs to the West of Chicago. The Distance Between These Two Towns Is Only 10 Miles, but on an East and West Line Between These Towns Are Seven Other Prosperous Suburbs Which the Company Is Planning to Serve on a 20-Minute Headway.

Although Each Bus Has a Seating Capacity of 30 Passengers, the Buses Quickly Proved Popular and Frequently Are Crowded to the Full Carrying Capacity.

The Buses Are Attractively Finished and Have a Length of 226 Inches Behind the Dash. They Are Designed for a Maximum Capacity Load of 5000 Pounds. The Chassis Weight Is 4750 Pounds.

'Fire Prevention Week' Arouses Interest

**Campaign to Prevent Loss of Life
and Property by Fire Is
Heartily Indorsed.**

NEW YORK, Oct. 11.—Fire Prevention Week in New York began with a last admonition from the Bureau of Fire Prevention to householders to clean up rubbish. Mayor Hylan presented medals to school children for the best essays on fire prevention. The children assembled on the City Hall steps, the department's band was on hand and there was speaking by the Mayor and the Fire Commissioner, Thomas J. Drennan.

These new rules for New York factory owners and employees are:

A sufficient number of water buckets should be provided (one bucket for each 400 square feet of area).

Be sure there are enough fireproof receptacles with covers for rubbish; also fireproof bins with self-closing covers or doors with fusible links for straw, excelsior, etc.

Have all swinging gas brackets replaced by those of stationary types.

Open flame gas jets should be provided with wire guards or glass globes.

Stock should not be piled higher than 18 inches from ceiling or sprinkler heads.

Examine all flexible gas tubing and connections for defects. Stopcock should be located at fixture, not at gas iron.

Pressing tables should be covered with 26-gauge metal. Floor under pressing tables should also be protected with metal.

Connect all gas stoves with rigid iron piping.

All means of egress should be posted with "Exit" signs, letters eight inches in height, illuminated with red lights.

Metal guards should be placed under and around gas and coal stoves.

All open electric motors should be provided with approved enclosures.

Fire drill should be held monthly and a record kept for inspection by the Fire Department.

Maintain aisle space at least three feet in width leading to all means of exit, including outside fire escape and passenger elevators.

Smoking is strictly forbidden in a factory. Offenders are liable to arrest.

Floors should be swept twice daily. Sweepings and rubbish should be placed in metal receptacles.

Doors leading into or out of a factory or any floor thereof should be kept unlocked and unfastened at all times during working hours.

Exists should not be obstructed by tables, benches, stock, etc.

Materials of any kind should not be stored in stairways or hallways enclosures.

Doors must open out in the line of egress. Doors of inside partitions should be double swing type, three feet wide.

Oily waste and rags should be kept in fireproof receptacles provided with self-

closing covers.

Doors leading to stairways must be self-closing and kept closed.

See that fire pails are kept filled at all times.

Keep covers on rubbish bins.

Do not place combustible stock near open gas or other flames.

Do not obstruct the flow of hose streams by piling stock higher than 18 inches below the ceiling.

Defective gas tubing should be reported immediately to your employer.

Always keep pressing irons on metal stands. Turn gas off at fixture, not at

gas iron.

Become familiar with the location of every exit.

Do not cut off your escape by placing obstructions in passageways.

Do not smoke in factory buildings.

Remember, it is your life and your job we want to save.

Hubert D. Bennett, formerly connected with the advertising department of the Willys-Overland, Inc., Toledo, has been appointed wholesale representative in the Boston district for the Studebaker Corporation of America, Detroit.

Clifton Names N. A. C. C. Committees

MANY leading automobile executives have been named by Charles Clifton, president of the National Automobile Chamber of Commerce, to serve the industry during the coming year. These men will devote their time to such subjects as highway development, taxation, better advertising and other topics related to motor transport. The roster for 1922-23 is as follows:

Advertising—Edward S. Jordan, (Jordan) chairman; W. K. Towers (Paige-Detroit), L. B. Dudley (Federal), G. U. Radoye (Haynes), A. B. Batterson (Buick), Wm. E. Betts (Studebaker), Geo. H. Phelps (Dodge Brothers), John C. Long (N. A. C. C.) secretary.

Foreign Trade—J. Walter Drake (Hupp), chairman; H. M. Robins (Dodge Brothers), R. C. Rathbun (White), H. B. Phipps (Hudson), J. D. Mooney (General Motors Export), Howard S. Welch (Studebaker), Geo. F. Bauer (N. A. C. C.) secretary.

Hand Book—E. T. Strong (Buick), chairman; R. C. Rueschaw (Reo), Geo. A. Kissel (Kissel), A. L. Curtis (N. A. C. C.), secretary.

Highways—R. D. Chapin (Hudson), chairman; Geo. M. Graham (Chandler), Wm. E. Metzger (Columbia), E. S. Jordan (Jordan), A. J. Brosseau (Mack), Pyke Johnson (N. A. C. C.), secretary.

Insurance—Wm. E. Metzger (Columbia), chairman; Milton Tibbetts (Packard), Stewart McDonald (Moon), E. E. Staub (Hudson), R. C. Rueschaw (Reo), Livingston Short (Buick), J. S. Marvin (N. A. C. C.), secretary.

Legislative—H. H. Rice (Cadillac), chairman; D. C. Fenner (Mack), J. I. Farley (Auburn), H. P. Doolittle (International Harvester), David S. Ludlum (Autocar), Harry Meixell (N. A. C. C.), secretary.

Motor Fuels Committee—John N. Willys (Willys-Overland), chairman; Wm. Robert Wilson (Maxwell), C. W. Nash (Nash), S. E. Ackerman (Franklin), Percy Owen (Liberty), Moie Cook (Service), C. F. Kettering (Buick), S. A. Miles (N. A. C. C.)

Motor Truck—Windsor T. White (White), chairman; E. A. Williams, Jr. (Garford), M. L. Pulcher (Federal), R. H. Salmons (Selden), D. C. Fenner (Mack), David S. Ludlum (Autocar), Robert O. Patten (Pierce-Arrow), Ray E. Chamberlain (Packard), F. E. Smith (Republic), F. W. Fenn (N. A. C. C.) secretary.

Passenger Car Show Committee—H. M. Jewett (Paige) chairman; F. C. Chandler (Chandler), J. Walter Drake (Hupp), S. A. Miles (N. A. C. C.) show manager.

Passenger Car Standards—N. E. Wahlberg (Nash), chairman; H. T. Thomas (Reo), Geo. B. Allen (Liberty).

Patents—C. C. Hanch (Lexington), chairman; A. J. Brosseau (Mack), James McAvoy (Chevrolet), Wm. MacGlashan (Studebaker), H. M. Jewett (Paige), R. A. Brannigan (N. A. C. C.), department manager.

Service—F. J. Wells (Pierce-Arrow), chairman; L. C. Voyles (Marmon), A. B. Cumner (Autocar), F. A. Bonham (Durant), W. M. Warner (Cadillac), H. R. Cobleigh (N. A. C. C.), secretary.

Taxation—C. C. Hanch (Lexington), chairman; H. H. Rice (Cadillac), J. Walter Drake (Hupp), Geo. M. Graham (Chandler), Fred J. Haynes (Dodge Brothers), Pyke Johnson (N. A. C. C.), secretary.

Traffic—Wm. E. Metzger (Columbia), chairman; A. T. Waterfall (Dodge Brothers), F. C. Chandler (Chandler), Geo. M. Dickson (National), W. L. Day (G. M. T.), J. S. Marvin (N. A. C. C.), department manager.

Truck Standards—D. C. Fenner (Mack), chairman; F. A. Whitten (G. M. T.), E. M. Sternberg (Sterling), A. Morehouse (Packard), H. E. Derr (International), F. W. Fenn (N. A. C. C.), secretary.

Educational Department—John C. Long (N. A. C. C.), secretary.

National Councillors to Chamber of Commerce of U. S. A.—A. J. Brosseau (Mack), Alfred H. Swayne (G. M. T.)

Representatives of National Industrial Conference Board—A. J. Brosseau (Mack), Alfred H. Swayne (G. M. T.)

Representative on Highway Education Board—Roy D. Chapin (Hudson).

Seek to Eliminate "Fly by Night" Trader

Undesirables Operating in Export Business Cause Harm to Legitimate Manufacturer.

NEW YORK, Oct. 13.—A real old-fashioned house cleaning to eliminate "fly-by-night" trader, the non-American "hanger-on" and the unscrupulous and insincere element generally from the American export field was advocated tonight by Dr. Julius Klein, director of the Bureau of Foreign and Domestic Commerce of the Department of Commerce, speaking before the Export Managers' Club here.

"With improving conditions, Dr. Klein declared, these undesirables are beginning to reappear in export centers." "It is the duty of every believer in the economic future of this country," he said, "to help stop their operations."

According to Director Klein our exports are now moving out at the impressive rate of nearly \$4,000,000,000 a year—a formidable figure which is vital to the stability of our whole industrial and commercial edifice. It must not be jeopardized by the dealings of "irresponsible opportunists."

The tempting openings for these "Wallingsfords of Export" are multiplying every day. Our sales abroad are no longer confined to a few big self-selling staples like cotton, wheat or copper. Nearly 49 per cent. of American exports are now made up of manufactured or partly manufactured articles, great quantities of them being the products of factories which were expanded during the war and are now realizing the value of permanent overseas outlets.

The function of the Bureau of Foreign and Domestic Commerce, Director Klein explained, is to promote American commerce abroad. Whether the manufacturer or merchant requesting aid is large or small makes no difference. The biggest corporations and banks in the country make constant use of the bureau. It is also being called upon every day by thousands of small factories and dealers whose individual export interests amount to less than \$10,000 a year. In the week ending Sept. 23 the bureau's New York office handled foreign trade problems for no less than 10,200 inquiries whose transactions were of all sizes and descriptions.

True Americanism reflected in intelligent well-planned export effort is the only credential required of any business established in order to take advantage of the best Uncle Sam has to offer in the way of assistance and counsel in approaching the world's markets. The Department of Commerce is endeavoring through this organization to "pay dividends on taxes," but it proposes to confine these dividends to bona fide American houses whose export interests are sincere and permanent. "The government's latchstring, Dr. Klein declared, is to be placed beyond the reach of those

WANT STIGMA TAXES REPEALED

A COMMUNICATION from the office of W. J. Brace, president National Automobile Dealers' Association, five copies of which have been sent to all automobile and truck dealers in the United States, reads as follows:

"The war has been over for four years yet the automobile industry is still paying WAR TAXES. Three per cent. upon trucks and five per cent. upon automobiles, accessories, tires, parts, etc.

This is a tax upon transportation. Congress recognized in the 1922 revenue bill that taxes upon transportation were unwise by REPEALING the tax upon railroad transportation. But no relief was offered to the kind of transportation furnished by the motor vehicle.

"In the recent tax bill revision Congress absolutely removed the taxes from musical instruments, sporting goods, chewing gum, thermos bottles, fur goods, toilet soaps, picture frames, perfumes, hair dyes, toilet waters and patent medicines, but the tax upon transportation furnished by motor vehicles remain—a burden and a menace to the automobile industry.

"Congress is now in adjournment. When it reconvenes this winter we want behind us the united support of the automobile dealers to remove this burden from our industry.

"You can help us do it. We want you to address a personal letter to your Congressman and Senator setting forth your views on the subject and asking him to help us remove the discriminatory taxes on the automotive industry. We want you to go a step further and address the same kind of a letter to any candidate for Congress in your district. We want to find out who among those men want to retain the burden on our industry and who will stand with us in our effort to effect repeal of the discriminatory war excise taxes that are imposing a burden of more than \$100,000,000 a year in addition to all other taxes upon the sales of our products.

"Will you do this? Every substantial automobile dealer in the United States is being asked to join in this effort for the industry. If you will do your part I think the result will surprise all of us.

"When you have done as we have asked send us a copy of your letter and all copies of the replies—addressing all replies to headquarters, 320 N. Grand Avenue, St. Louis, Mo. From the information gained from these sources we will map out our campaign of action.

"The war is over. Lets rid ourselves of the war taxes.

"Yours for fair treatment of our industry."

NATIONAL AUTOMOBILE DEALERS' ASSOCIATION.

W. J. BRACE, President.

who would use it only to gain entrance for some temporarily embarrassed European competitor or for some questionable scheme which was discouraged by the frost of 1920 and 1921. Despite propaganda to the contrary, this country has established a splendid reputation for uniform quality and honest dealing in foreign markets and this reputation must be maintained."

Director Klein predicted a gradual but sound rebuilding of our export trade and said that the Department of Commerce is making every effort to bring the profits from it into every small manufacturing village in the country. In connection with our future welfare in the overseas markets he asserted that "price cutting, long terms, are not the trumps in America's hand." In his opinion, "well directed sales effort, honest desire to do business at a moderate but adequate profit over a long term of years, cooperation with the foreign distributor and well conceived advertising, are the weapons of America, and they can be used just as well by the small soap manufacturer who knows the wants of his foreign customers and how to satisfy them, as by the most gigantic corporation of which our nation boasts."

With foreign exchange assuming a more normal tone it is to be hoped that export business will continue to expand and a way found to weed out undesirables.

GARY MOTOR TRUCK CO. INCREASES PRICE.

GARY, IND., Oct. 10.—An increase in the price of all trucks manufactured by the Gary Motor Corporation has recently been announced. These new prices are as follows:

	Old Price	New Price
Model F—1½ tons.....	\$1675	\$1775
Model I—2 tons.....	2250	2450
Model J—2½ tons.....	2650	2850
Model K—3½ tons.....	3650	3790
Model M—5 tons.....	4100	4450

S. M. WILLIAMS HEADS AUTOCAR BRANCH

NEW YORK, Oct. 10.—S. M. Williams, formerly with the highway council in Washington and since that time associated with the Autocar Company, has been appointed manager of the branch in this city. Mr. Williams, well and favorably known to the trade through his long connection with the industry, has been fortunate in having an experience that falls to few men and is considered to be unusually well qualified to take over his new work.

It is understood that a sales campaign is rapidly being mapped out.

Marvin Seeks Aid for Rail Shipments

N. A. C. C. Official Goes to Washington in Endeavor to Solve Freight Tie-Up.

NEW YORK, Oct. 9.—James Marvin, head of the traffic department National Automobile Chamber of Commerce, has gone to Washington for a conference with the Interstate Commerce Commission and the Car Service Commission in an endeavor to solve problems consequent on railroad congestion and embargoes which have greatly increased shipping difficulties for automobile manufacturers. The situation as it exists is serious and it is believed that automobile manufacturers, should Mr. Marvin's efforts for relief be unsuccessful, will have to resort to driveaways and also to transportation by motor truck if they are to get materials to their factories and the finished cars into the hands of their dealers.

ELDRIDGE EXECUTIVE CHAIRMAN A. A. A.

WASHINGTON, D. C., Oct. 11.—Maurice O. Eldridge, who has been director of roads of the A. A. A. Good Roads Board for the past three years and in direct charge of all legislative activities of the A. A. A., has been named as executive chairman of the association and has assumed active charge of the association's work throughout the United States. Mr. Eldridge was selected at a meeting of a special committee, named to select an executive chairman, which was held at Cleveland, O., on Sept. 20.

The new executive chairman brings to his task a record of 25 years of successful work in the U. S. Bureau of Public Roads. While assistant director of that bureau Mr. Eldridge performed an enormous amount of original research and development work on road and transportation problems, and for five or six years previous to associating himself with the A. A. A., he cooperated extensively with the late A. G. Batchelder in good roads programmes. A graduate of the scientific school of George Washington University and a civil and highway engineer of high standing, Mr. Eldridge has made road problems his life work, and has probably delivered more lectures on this subject than any other man in the United States.

For the past three years he has kept in the closest touch with all legislative matters of a national nature affecting the motorists of the country until today he is probably the best posted man in the country on such questions. He engineered the A. A. A. fight which resulted in the abandonment of the proposed federal tax on automobiles; successfully opposed the A. A. A., paying of a soldiers' bonus by means of an additional tax on automobiles; drafted the first federal aid law, which was introduced by the late



Service and Distributing Station, Bessemer Truck Company Located at New Haven, Conn., Which Will Handle New England District.

Congressman Brownlow of Tennessee; was active in the defeat of the Mills bill, intended to bring about national taxation and registration of automobiles; and was active in having the Dunn bill, which proposed to limit federal aid to \$12,500 a mile for 1923 and \$10,000 per mile thereafter, amended to allow federal aid of \$16,500 per mile for 1923 and \$15,000 per mile thereafter.

The new executive chairman brings to his task a knowledge of the principles governing the A. A. A. second to none in the organization and a knowledge of conditions that will enable him to cope successfully with the many problems that are constantly arising in the organization. His first work will be the establishment of new state associations in Ohio, Indiana and Maryland, where parts of the organization have gone to another organization.

Cooperation will be the watchword under the Eldridge administration and the new chairman hopes to see the A. A. A. constantly increase its service to motorists of the United States and expanding into a still greater organization than it is at present.

SEEK TO OUST BIRMINGHAM JITNEY BUSES.

BIRMINGHAM, ALA., Oct. 7.—Business men of this city who are members of the Civic Association, have gone on record as opposed to the more than 200 jitneys now being operated in this city, as a result of which it is entirely probable that within a short time all service will be by street cars.

The Birmingham Railway Light and Power Company, for some time in the hands of a receiver, is also said to be behind the movement to oust the jitneys, as it is stated that the operation of the motor carriers is materially responsible for the present financial condition of the company.

No statement has been directly made

with regard to the operation of the several established bus lines now operating out of the city, although it is currently reported that should action of any kind be taken the bus lines also would be put out of business.

DENVER REPORTS DAILY SALE OF TRANSPORT.

DENVER, Oct. 12.—An active and increasing market for motor trucks is generally reported. In this the testimony offered by distributors and dealers is of first importance. Sales to the truck users who must have motor transportation in the pickup of business in a thousand and one lines, is the evidence that counts.

The Swenson Auto Company, local distributor for Colorado, Wyoming and New Mexico, reports that their sales of Transport trucks have averaged one a day and that a still bigger truck business is in sight.

Reports of the most active truck business of two years come to the Transport from its distributors in New York and other important trucking centers.

RUGGLES TRUCK TIME BETTERS TRAIN TIME.

MILWAUKEE, WIS., Oct. 10.—Carrying a load of mail from the local post-office which it left at 2:10 a. m. yesterday, a Ruggles delivery truck arrived in Oshkosh at 4:16, making an average of 41 miles an hour for the run, bettering the usual train time. Milwaukee police officials and sheriffs of towns through which the truck passed accorded it the right of way over Highway No. 15, the all-concrete road leading from Houghton, Mich., to St. Louis, Mo. It is stated that Highway No. 15 eventually will connect Michigan with New Orleans and it is considered that this highway is the most important in Wisconsin from the standpoint of motor truck transportation.

Truck Business in Minneapolis Shows Marked Improvement

Conditions Point to Big Sales in 1923—Farmers Assured of Good Crop Prices Will Be in Market for Commercial Vehicles. Strike Has Aided Trade.

(Special to Motor Truck.)

MINNEAPOLIS, MINN., Oct. 14.—Motor truck business in this city and throughout the immediate vicinity continues to show a slight gain, it is believed, and there is more activity along the line of sales to farmers than to any other class of trade.

As a matter of fact general business is better than it has been for quite some time and now that farmers are receiving the first real money many of them have had for many months, they are paying their bills again, some of them are settling accounts which have been standing for the last 2½ years. It is not expected that a great deal of business will be done this fall as cold weather undoubtedly will tend to slow up sales, but dealers throughout this section are especially optimistic over prospects for 1923 and state that there is every indication that good business will prevail with the opening of the highways in the spring.

It is estimated that more crops have been carried to market by motor trucks this year than any other previous season, this due to in part to the good highway conditions and also hinging to an extent on the railroad tie-up which, while not particularly serious from the viewpoint of passenger transportation, has been extremely hard on the shipper who has had little assurance that his goods properly could be taken care of.

The railroad strike is called by one dealer "a blessing in disguise," since it has proven conclusively to the agriculturist that he can move his farm crop by the power hauler at a much lower price than by railroad, and it is stated by those in close touch with matters that those men who have purchased their first trucks will never go back to the older methods, all of which means increased sales for the future.—A. J. Swenson.

MAY TRANSPORT STEEL BY MOTOR TRUCK.

PITTSBURGH, PA., Oct. 11.—Detroit automobile manufacturers who have been at some disadvantage in obtaining steel with which to work due to the railroad tieups contingent on the shopmen's strike, have announced that unless better shipping facilities are provided they will be compelled to resort to motor truck transportation.

Ten days and frequently two weeks is now required on rail shipments from this city to Detroit, whereas prior to the tie-up delivery was made in three days by the railroad. In addition to the rail delay steel ready for shipment also is be-

ing held at the mills sometimes for periods of a week and longer before cars are available for loading and the question of getting the steel to the plants is rapidly assuming grave proportion.

It is understood that production schedules at the automobile factories are being materially interfered with, all of which in connection with the shortage of coal and the facts that the lakes will soon be closed to transportation are giving automobile manufacturers cause for grave concern.

RAILWAY ASSOCIATION HAS "FRIENDLY FEELING" FOR MOTOR TRUCK

CHICAGO, ILL., Oct. 10.—The American Railway Association in session here, recently among other business transactions adopted a resolution in favor of expressing a "friendly attitude" toward the motor passenger carrier, which it explained was "a valuable feeder and auxiliary to the electric railway."

This unusual resolution has called forth considerable comment on the part of men in the trade, many of whom profess to find no little amusement in the statement, since in their opinion the electric railway if the motor bus continues in its development may soon be in a position to receive a similar compliment from the bus. There appeared, for some reason not definitely explained, to be an under current of feeling against the motor bus, which was particularly noticeable at the recent meeting, and despite the fact the resolution was distinctly friendly in tone, the statement has been made that it was rather of a patronizing nature instead of being distinctively congratulatory.

UNITED MOTOR PRODUCTS APPOINTS BEARDSLEY.

GRAND RAPIDS, MICH., Oct. 9.—Volney S. Beardsley has been appointed western district sales manager of the United Motors Products Company, which is actively in production now of a new one-ton speed model, the "Highway Special."

Mr. Beardsley, whose headquarters are in Los Angeles, is one of the best known representatives on the Pacific coast, he having been a pioneer in truck sales and having handled motor trucks exclusively for the past 18 years.

Appointments will be made immediate-

ly of dealers in coast cities not already closed, as Mr. Beardsley will act only as the factory representative, controlling no retail outlets himself.

G. R. Wilber, vice president and general manager of the United Motors Products Company, has just made a flying trip through the eastern territory and reports that production of the new "Highway Special" one-ton model is being pushed beyond the limit anticipated, as orders for sample jobs are being received from every section of the country and some newly appointed dealers have ordered car load shipments from specifications without waiting to see the actual truck.

Expectations based upon a study of the trend in truck buying are being more than realized in the response which has greeted the announcement of the "Highway Special" at its new low price level for an electrically equipped truck chassis, \$895.

LONDON, ONTARIO. STREET RAILWAY QUILTS.

LONDON, ONT., CANADA, Oct. 11.—Seven tickets for 25 cents and for workmen during certain hours of the day nine tickets for the same price, has not enabled the street car company of this city to continue to operate against the motor buses and it is now announced that despite the lowest fare in the United States or Canada the company will not be able to operate further and will soon pull up its rails and abandon the uneven battle.

STEEL INDUSTRY SHOWS BETTER TONE.

PITTSBURGH, PA., Oct. 9.—The steel industry is in somewhat of an easier position than a week ago. Various occurrences have contributed to this condition, principal among which is a lessening of the car shortage and the consequent ability to take some tonnage off the ground and start it on the way to customers. Coal supplies and reserves also have increased rapidly in the Pittsburgh and Wheeling districts, due to the availability of the rivers for transport.

HAWKEYE TRUCK COMPANY LOWERS PRICE.

SIOUX CITY, IA., Oct. 8.—The Hawkeye Truck Company announces new prices on its trucks, which are slightly lower than those of recent date. It also decided that 3½ and five-ton trucks will be built on order only. The new prices follow:

	Old Price	New Price
1 ton	\$1500	\$1375
1½ tons	1850	1645
2 ton	2650	2145

STOUGHTON LIGHT TRUCK PRICE LOWERED.

STOUGHTON, WIS., Oct. 9.—A reduction in its model C light speed truck from \$1240 to \$1095 is announced by the Stoughton Wagon Company of this city.

"Tour-a-Bus" Body Meets with Approval

A STATEMENT made by Wayne Taylor, bus operator, of Owosso, Mich., and given wide publicity by the Weatherproof Body Corporation, Corunna, Mich., manufacturer of the well known Tour-a-Bus body, is as follows:

"I have been running a bus line for the past eight years between Owosso and Flint, Mich.—a distance of 26 miles—the trip being made in one hour. I operate five buses on a two-hour schedule. The route is not what you would call thickly populated—almost all of the traffic being "through" — from Owosso to Flint or vice versa. The enterprise as I have operated it has been an exceptional good investment. But to make it such I have had to study every detail.

"I have experimented with the large motor coaches, with tour-a-buses, touring cars, etc., but my greatest success has been with a one-ton Reo Speed Wagon mounting a tour-a-bus body.

"This body accommodates 25 peo-

ple comfortably, besides several trunks. The seats are of the Marshall type cushion construction with room under each seat for valises. By the use of this body I carry seven or eight more passengers than I am able to carry with other heavier bodies and with a Reo Speed Wagon my drivers can make the necessary time. This is due to the light weight of the tour-a-bus body with its slanting windshield, reducing wind resistance.

"I have found that the majority of us believe we must use too heavy a body and too large a chassis. The frame on this car has a 22-inch extension. Body is 88 inches wide by 190 inches long. Dual pneumatic tires on the rear are used."

The specifications of the "Tour-a-bus" body are as follows:

Sills—2½-inch hard wood (ash, elm or maple). Width according to size of job.

Floor Boards—Built of hard wood, tongued and grooved. All joints sealed.

Frame—Hard wood throughout, bolted and screwed.

Deck—Full slatted deck, extra padded, covered with high grade, long-grain artificial leather.

Windows—Flexible, built of spring steel, reinforced with tie rods, covered with heavy, artificial leather with pyralin lights.

Windshield—Slanting, two-piece metal frame, crystal plate glass.

Paint—Outside, eight coats—primer, glaze, sand surfacer, two coats of ground color, two coats of color varnish and a finishing coat.

Trimming—Interior of deck trimmed with high grade diamond pattern whipcord lining. Seats and lazy backs covered with high grade, long-grain artificial leather.

Seats—Cushions, Marshall type springs, seven inches in front and five inches in the rear.

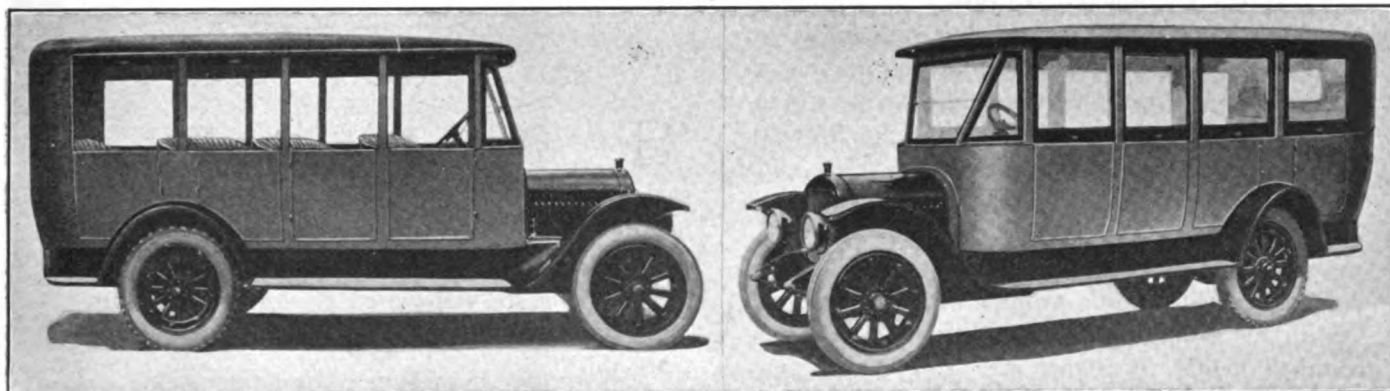
Lazy Backs—Coil springs.

Dome Lights—11 and 16 passengers have two lights, 20 and 24 passengers have three lights.

General Measurements—No. of passengers 11, 16, 20 and 24—all include driver. Distance front to back at sills, 11 passenger, 152 inches; 16 passenger, 152 inches; 20 passenger, 189 inches; 24 passenger, 227 inches. Distance front to back over all, 11 passenger, 160 inches; 16 passenger, 160 inches; 20 passenger, 197 inches; 24 passenger, 235 inches. Width outside, 11 passenger, 64 inches; 16 passenger, 78 inches; 20 passenger, 78 inches; 24 passenger, 78 inches.

General Measurements—Height, sill to belt line, 30 inches; sill to top of deck outside, 62 inches; floor to inside of deck, 60 inches. Doors, very wide. Width of seat inside, 11 passenger, 51 inches; 16, 20 and 24 passenger, 65 inches. Depth of seat, 19 inches. Distance back to back of seats, 34 inches.

Weight—11 passenger, approximately 1200 pounds; 16 passenger, approximately 1500 pounds; 20 passenger, approximately 1800 pounds; 24 passenger, approximately 2200 pounds.



Type of "Tour-a-Bus" Body Manufactured by Weatherproof Body Corporation of Corunna, Mich., Which Has Been Widely Adopted by Bus Operators.

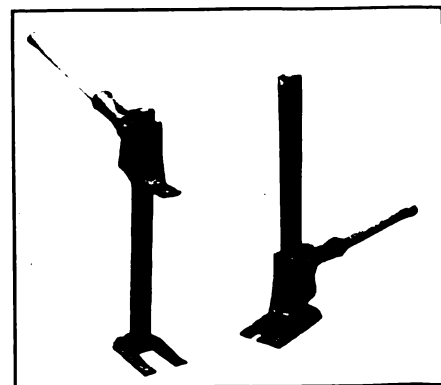
New Wrecking Jack Has Novel Features

THE accompanying photo shows the new wrecking jack now being made by Kimmerle Brothers of San Francisco.

There is a need in the towing and wrecking business for a jack that will lift from the ground to a height great enough to allow the application of a towing device without the necessity of blocking and using another jack. The Kimkin wrecking jack will lift from one inch off the

ground to a height of 20 inches without changing the position of the jack.

The jacks are equipped with a safety device which will not allow both pawls to be thrown out at the same time. To change direction of the jack, pole socket must be in the proper position. It is not necessary to force the latch. When the pole piece is in proper position it will move easily.



This Jack Will Lift Up to 20 Inches Without Necessity of Changing Adjustments

PERTINENT POINTED

"CHASE OLD MAN DIGNITY OFF THE LOT."

DOUGLAS FAIRBANKS, in a recently written book says that the first thing to do if one would keep fit is to "Chase old man dignity off the lot;" good advice from a viewpoint of general physical health and entirely applicable in a business sense as well, especially for the man who sells cars and trucks.

The dealer who has a smile and a pleasant word of greeting for all, regardless of their station in life, has a standing in his own community that the dealer who is always on his dignity can never hope to attain.

We are rather fond of citing instances, or examples, to prove our contentions; not because the method offers the easiest way of writing an editorial, but simply because actual facts are more convincing than mere argument; for this reason we are going to tell you of how one dealer lost one sale of one truck simply because he was more fond of dignity than he was of selling trucks.

This man has always had rather an "upstage" air about him; is only coldly courteous and is so dignified that he appears always to be nursing a perpetual frown. One morning about three weeks ago when he was feeling his dignity rather more than usual, a roughly clad and rather ill-kempt man came into his sales room. The dealer, who was reading the paper, glanced up but a second and then went on with his reading. The visitor stood around with his tattered cap in his hand for a few moments and then coughed loudly to attract attention, whereupon the dealer, as though vexed at being disturbed, asked in his usual cold manner, "Well, what do you want?"

The other looked at him a moment and then answered with spirit, "Not a damned thing from you," and went out. Within two hours he had bought a one-ton truck for cash from another dealer; I know the facts of the incident because the purchaser, a well-to-do farmer, has supplied me with milk for several years and he told me the story last Saturday afternoon when he brought his monthly bill. And the story isn't finished either, because the milk dealer, one of a large family, has several brothers who use trucks in various work; they're always prospec-

tive purchasers—and the dealer in question won't get any of their money.

This incident relates one sale that the dealer lost because he was too dignified to pass a cheery word with one whom he probably considered too far beneath him in the social scale to merit decent treatment; how many other sales has he lost through just such tactics? It's fortunate for the motor truck business that not all dealers are of his stamp; there'd be few sales made if they were.

Dignity is all right in a professional man perhaps, but when it comes to keeping the average business running along in high it's entirely out of place—the only field we can think of where it might fit is in the undertaking business; they don't need any of the finer points of salesmanship in that game; everybody's just dying to take a ride with them anyway.

Let's pass along the smile and the pleasant word; for one reason because it's the proper, human thing to do and for another—because it pays cash dividends.

TEAM WORK.

"THE territory is a good one, and a real salesman should make a fine showing," said a motor truck manufacturer's representative in talking with a business man who was thinking of handling the line.

"Perhaps so," answered the other doubtfully, "but why did the other man who sold the truck fail?"

"Because he didn't sell it," answered the factory man. "He spent almost no time in selling trucks," he averred enigmatically.

"But he was always busy," defended the prospective dealer.

The other nodded. "Always busy **unselling the other fellow's truck,**" he qualified, "but almost never busy in **selling his own.** You take over the line and attend strictly to the business of **selling our truck** and don't so much as mention the other makes and you'll find this is a mighty productive territory."

This conversation took place one year ago and is recorded because the prospect, convinced by the factory man's argument, established him-

COMMENT OF THE DAY

self in business and has made good in every way—thus proving that the field manager had the right slant on the proposition.

Thinking along this same line, one might comment that much of the advertising done today, in effect, is written solely and entirely from the viewpoint of unselling the competitive product rather than to sell the product advertised. Such advertising, for the very good and sufficient reason that it undermines the goodwill of the public, is destructive instead of constructive and makes for just so much more sales resistance.

It's easy to boost your own product, at the same time boosting the industry in general and once every advertiser realizes this, there will be a whole lot more business done. Scrutinize your copy carefully and don't release any that is not in every way constructive and generally designed to enhance business as a whole. After all it's team work that wins; you wouldn't bet much money on a baseball team whose players were always wrangling over which one was the best player.

TAXING TRANSPORTATION.

ASSUREDLY the man who purchases sporting goods can afford to pay an excise tax much easier than can the average man who purchases a motor truck and yet for some reason not explained the tax on sporting goods, effective by a law passed in 1918, has been lifted, while the motor truck tax still remains.

Toilet soaps and powders, articles made of fur, fine perfumes, toilet waters, hair dyes, patent medicines, picture frames, fans, thermos bottles, chewing gum and musical instruments—down-right luxuries every one of them—have been exempted from the odious tax, but “trucks, tires, parts and accessories,” still are paying for the war.

Something should be done to relieve the stigma tax now levied on motor trucks. W. J. Brace of the National Automobile Dealers' Association has prepared a plan to combat this “tax on transportation,” which is set forth in detail on page 558 of this issue of MOTOR

TRUCK, and it is to be hoped that everyone even remotely interested in a square deal for the commercial vehicle will follow the suggestion outlined by Mr. Brace.

The people haven't as much voice in the affairs of government as they had a few decades ago and their chance to be heard on the vital issues of the day rapidly is growing less, but the Congressman or Senator who, daily, for a week or two, receives a bundle of mail setting forth the views of his constituents on any one subject is bound to pay some attention—so before you read further turn back to page 558, study the article headed, “Want Stigma Taxes Repealed” and write your letters.

Let's see if a mass-formation play won't accomplish what individual effort thus far has failed to do.

“BLOW HOT—BLOW COLD.”

SINCE the foregoing editorial was written—in fact just as we go to press, we receive from Washington the joyful news that Federal taxes on gasoline and motors according to horsepower may have to be resorted to as a means of raising a part of the \$350,000,000 deficit anticipated by the Treasury Department and caused by the slump in income tax collections, it being asserted that Secretary Mellon, who some time ago was thwarted in a plan to pin on such a tax, still avers that it is the best method of raising the money.

How do they get that way—these men of supposedly high principle who dodge income taxes on their own properties by the shady method of issuing stock dividends; who, yielding apparently to improper pressure, remove the excise tax from silly, foolish luxuries without which the average person would be better off—and then barefacedly tax the purchaser of a motor truck for the privilege of buying the machine and after he gets it for the fuel with which to run it—fuel produced by a company that can pay a stock dividend of 300 per cent. to its shareholders on which no income tax is levied.

“Something is rotten in Denmark”—and other localities as well.

The Transportation Problems of 1922

THE sustained welfare and prosperity of the farm implement business—and, in fact, of all business—depend upon having a national system of strong, efficient railroads, able to furnish their patrons at all times ample transportation service.

The importance of having railroads able to serve the public adequately and efficiently is forcibly impressed upon us just at this time by the sudden revival of business activity following a prolonged period of depression.

A few months ago the railroads found it difficult to provide storage space for idle equipment, and now they are hard pressed to supply all the cars needed for the transportation of coal, farm products, building and construction materials, and other commodities.

It is certain business will continue to be good and railway traffic heavy this fall and winter, and that there will be some unavoidable inconvenience to shippers.

HOWEVER, if the public will be patient, realizing the handicaps under which the railroads are struggling, and will be liberal with its support and cooperation, I believe we can go through the winter without serious distress. The railroads, you may rest assured, will do their utmost with their limited facilities.

Ordinarily, fall and winter supplies of bituminous coal are partly laid in during the summer, before the heavy season of railway traffic occasioned by winter and the movement of farm products begins. Last summer, however, the unionized bituminous mines were inactive for practically five months, and as a result a heavy coal traffic is thrown upon the railroads at a period of the year when other traffic, under normal conditions, is at its height.

The bulk of the enormous crops which the farmers of the United States have raised this year as their contribution to a season of plenty, will be marketed during the next few months. The Department of Agriculture has estimated that the country's 14 leading farm crops this year are valued at \$7,134,654,000, as compared with \$5,935,861,000 in 1921, an increase of about \$1,200,000,000. Moreover, the 1921 farm crop has been put into the ground and brought along to harvest at materially reduced costs, as compared with the last few years, which means that, at prevailing prices, the farmers bid fair to make profits that

can be spent in the purchase of goods. All the leading crops are expected to be larger in bulk than last year, with the exception of corn, which, however, promises to make a good crop. Cotton lost ground during the late summer, due to the drouth and the boll weevil, and, since there was a small carry-over from last year, the cotton trade is expecting a shortage of cotton during the next year. However, conditions in the South have improved substantially over what they were during the last two years. The South is being gradually weaned from its dependence upon cotton for its "money crop," and the production of live stock, dairy products, grains, hay, fruits and vegetables is proving the economic salvation of that part of the country.

Industrial Skies Clearing.

Industry generally has been getting back to normal after the long depression, although its return has been interrupted by strikes. As is always the case with strikes, they have caused not only voluntary idleness in the industries in which they have occurred, but other workers have been made idle by the restricted buying power of their fellow workers. Now, however, the industrial skies are clearing, and I believe we shall find the employment situation improving constantly.

A year ago, when the railroads were in a position to provide more transportation service than their patrons demanded, there was widespread agitation for lower rates, although the railroads as a whole were not earning a fair return. The demand for lower rates was so insist-

ent that the Interstate Commerce Commission ordered reductions, rates which, together with the reductions voluntarily made by the railroads, amount to about \$400,000,000 a year. When this agitation for reduced rates was going on the public gave little thought to the need of getting the railway machinery of the country into shape to handle the rush of business that was certain to follow the depression. Now that the railroads are straining every nerve to provide the transportation service demanded by the increased flow of business, I predict that we shall hear little agitation for lower rates and a great deal of agitation for more railway facilities and equipment.

The business of the country increases periodically, although the increase is very irregular and marked by wide fluctuations. The freight traffic of our railroads in 1921, for example, was less than in any year since 1915, a falling off from the traffic of 1920 of about 25 per cent. It is difficult to draw a line on the chart of business and predict that business will increase at a given rate. In the decade from 1890 to 1900 the freight traffic of the railroads increased 86 per cent., in the decade of 1900 to 1910, 80 per cent., and in the decade of 1910 to 1920, 62 per cent.

One thing is certain: The capacity of the railroads to handle the business of the country must be increased constantly, regardless of temporary fluctuations in traffic, or else there will be constantly recurring periods such as the present one in which the transportation machin-

Address by C. H. Markham, President Illinois Central Railroad, Presented at 20th Annual Convention of the National Association of Farm Equipment Manufacturers, Chicago, Ill., Oct. 18, 1922.

ery of the country is overloaded. No machine functions as well when it is overloaded as when it is carrying no more than its capacity, and the transportation machine is no exception. When just one more car or one more locomotive is needed than is available, the whole machinery of the railroad slows up. The shipper whose wants cannot be satisfied promptly is inconvenienced, and many other shippers are inconvenienced. The problem of railway management is to provide the right amount of cars, motive power, terminals and other facilities and equipment to handle the peak load of business without undue strain, and without, on the other hand, creating an over supply.

Restrictive Policy Handicaps Roads.

The railroads have been handicapped by adverse conditions in carrying out their programme for keeping facilities and equipment up to the needs of the country. They began falling behind several years before the world war, when rates were so low that earnings were depressed and investors were driven to other markets. Railway men, seeing what was coming, warned the public of the danger of a continued restrictive policy and its effect upon railway development. In an address delivered in 1912 the late James J. Hill called public attention to the fact that investors were being driven out of the railway market by a policy of strangulation against the railroads. He declared then that the natural material growth of the country would create a chronic transportation congestion unless this policy were abandoned and the railroads were permitted to earn enough money to pay principal and interest on investments made for enlarging and improving railway facilities and equipment.

Whether or not heed was paid to this warning is shown by the figures on the number of miles of new track built each year since then. In 1912, the year in which Mr. Hill's address was made, the railroads built 4212 miles of new track—that is including all track, not merely new lines. In the following year, 1913, they

built 4467 miles. Since then there has been an almost steady decline, and during the last four years they have built an average of only 933 miles a year. Moreover, since 1916 the number of miles of track abandoned each year has exceeded the number of miles of new track built.

The rate at which new equipment has been installed has likewise fallen off in recent years. For about a decade preceding the war, when the earnings of the railroads were kept down by low rates, and they were not enabled to secure the capital needed for extensions and improvements, they did not provide themselves with new equipment as rapidly as the growth of the country demanded. During the last four years, however, they have not even been purchasing as much equipment as before the war.

During the 10 years ending with 1917, the railroads installed an average of 2677 locomotives each year, of which 1696 went to take the places of engines that were sent to the scrap heap. During the last four years, however, they have added an average of only 1772 locomotives a year, or only 76 more than they formerly sent to the scrap heap each year. During the last four years at the rate at which locomotives have been retired from service dropped to an average of 1073 a year, which means that the railroads, in order to handle the business of the country, have had to keep in service locomotives that should be placed on the retired list.

The same is true of other kinds of equipment. During the 10 years ending with 1917 the railroads added an average of 120,254 freight cars a year and retired 82,416 a year, while during the last four years they have been able to add an average of only 59,740 a year and retire an average of only 59,258 a year. In the 10 years ending with 1917, the railroads each year sent an average of 1713 passenger cars to the scrap heap and put 2770 new ones in service, but during the last four years they have added only 1168 new ones a year and retired only 821 a year.

When the period of Federal con-

trol came to an end, the transportation act, under which the railroads have been operated since that time, provided that freight and passenger rates should be based upon their estimated power to earn for the railroads as a whole an annual net operating income of $5\frac{1}{2}$ per cent. upon tentative valuation, to which an additional $\frac{1}{2}$ per cent. could be added to provide for additional facilities and equipment. This rate was to extend for two years, or until March 1, 1922, after which time the Interstate Commerce Commission was to determine what should be a fair and reasonable rate of return. The commission this year decided upon $5\frac{3}{4}$ per cent. upon tentative valuation as fair and reasonable, and rates were revised based upon their estimated power to earn a net operating income at that rate.

These were estimated earnings. As a matter of fact, the net operating income of the railroads in 1921, instead of being six per cent. upon their tentative valuation, was only 3.31 per cent., which was just about sufficient to pay their rentals and interest charges, leaving nothing for dividends to the owners of the property or for additions and betterments. And in this year, in two months of which the railroads were supposed to realize a net operating income at the annual rate of six per cent., and since then at the rate of $5\frac{3}{4}$ per cent., earnings have been constantly below the estimate. For the first seven months of 1922 their net operating income was equivalent to an annual rate of 4.38 per cent. upon tentative valuation. In other words, they failed by about \$156,800,000 to realize a net operating income at the six per cent. rate.

The revenues of the railroads will be increased as traffic continues to grow, and the financial reports of the railroads this fall and winter probably will be materially improved. In anticipation of this increase the market for railway investments has already picked up, and since the first of this year the railroads have been making more extensive investments. During the nine months of Jan. 1 to Sept. 30,

this year, the railroads placed orders for 1649 locomotives, which was more than seven times the number during the whole of last year; 112,920 freight cars, which was nearly five times the number ordered during the whole of 1921, and 1437 passenger cars, which was about six times the number ordered in 1921.

It is to the interest of every man engaged in gainful occupation that the railroads shall be permitted to expand as the business of the country expands. In order to do this, they must be allowed to adjust their freight and passenger rates, the rates of pay of their employees and other items of income and outgo so that their net earnings will be sufficient to attract investors to railway securities.

It has become practically impossible for the railroads to make substantial improvements in and additions to their plants from surplus earnings for the very fact that under regulated rates surpluses do not accumulate. The railroads have been forced to give their patrons the immediate rather than the deferred benefits of the economies which have been made in railway operation, constantly accepting reduced rates and financing additions and betterments with borrowed money. That tendency to lower rates was interrupted by the increased cost of labor, materials and supplies brought about by the war, but it is an undisputed fact that prior to the war American railway rates were the lowest and American railway service was the best in the world. I believe, American railway service is still the best in the world, and I believe the constant effecting of economies and readjustment of labor and other costs will again work about to make American railway rates the lowest in the world, if they are not the lowest at present.

The American people can have whatever kind of railway service they want and are willing to provide for. Practically every phase of railway management and operation is supervised by one or more of the legislatures, commissions and boards that exercise control over railway affairs, charged with promoting and

protecting the public welfare. Through these agencies public opinion rules the railroads. Our problem, therefore, is to create a public opinion that will be constructive, not destructive; that will make the railroads better able to render that prompt, efficient service which is their obligation to the community, not less able to render it. The public needs to be educated about the railroads and their problems, so that it will demand of its representatives who legislate, regulate and supervise railway affairs a constructive, forward-looking treatment of the railway question.

Constructive Regulation Desirable.

From time to time it is suggested that we should return to the days before regulation and give to railway managements the utmost freedom in running the railroads. These suggestions doubtless grow out of the many abuses which have crept in during the 35 years since regulation first began to spin its entangling web about the freedom of railway managements. I do not favor such suggestions. I believe that the railroads, because of their fundamental importance to the welfare of all other business, should be operated under the supervision of agencies controlled by the public. The blame for past abuses lies not in regulation itself, but in the fact that regulation has not at all times been intelligently inspired and directed. While removing regulation would correct some abuses, the proper way of insuring railway progress, in my opinion, is to educate the public on railway matters so that regulation will be fair and constructive.

I feel there is a great need for a better understanding of the railroads and their problems. If public opinion about the railroads is to be constructive, the public must be intelligently and fully informed on the subject. We have had too much of quack remedies; the railroads need a capable physician. It is unfortunately true that public opinion about the railroads has in the past been largely dominated by those who have been working, either consciously or unconsciously, for their destruction.

Railroads Not Over-Capitalized.

Take the matter of alleged over-capitalization as an example of how public opinion has been misled by anti-railway agitators. For years we have heard a great deal about the railroads being over-capitalized. Critics of the railroads were finally successful in having the Congress provide for a valuation of all the railway property in the country by the Interstate Commerce Commission. That valuation work has now been going on for more than eight years. The railroads' critics fully expected that the commission's valuation would show the railroads as a whole to be over-capitalized. As a matter of fact, however, it has already shown that the railroads as a whole are greatly under-capitalized. When the transportation act went into effect in 1920 the commission was required to determine a tentative valuation of railway property for rate-making purposes, and, after reviewing the material which had been assembled in its valuation proceedings and other information gathered during the 35 years of railway regulation, it placed the tentative valuation for rate-making purposes at \$18,900,000,000, which was approximately \$2,350,000,000 greater than the total outstanding stock and bond issues of the railroads at that time. Again this year the commission reaffirmed its former valuation estimate. I believe you will agree with me that this is sufficient evidence to convince any fair-minded person that the railroads of the country are under-capitalized.

We must educate the public if we are to expect intelligent public opinion. You men can help to do that by giving facts to combat the untruths you hear, and by demanding of railway critics who impose their views upon your communities that they support their statements with proof.

Transportation by Water.

Many persons believe inland rivers and canals should be used more extensively for transportation purposes. I am not opposed to inland waterway transportation where such transportation is more economical and more practicable than

by rail, but I am opposed to wasting millions of dollars upon chimerical projects that are impracticable and uneconomical. The agitation for waterways has in the past been based too largely upon sentiment instead of common sense.

I can join heartily in paying a tribute to the service performed by our early inland waterways. They were the forerunners of the railroads, pioneers in the field of transportation. They made possible an early settlement of this middle-west country, and for a good many years they were the principal means of carrying on commerce. That, however, was in the days before the railroads had reached a stage in their development where they surpassed these primitive carriers in economy and practicability.

Steamboat days on the Mississippi have been clothed with a romance which stirs our hearts and enkindles our memories, but an appeal to that sentiment does not constitute sufficient evidence that the impulsive old river can be made to carry a considerable portion of the traffic required by the millions who now populate its valley. It is pleasant to dream of giant boats and barges plying up and down our inland rivers and canals carrying the products of agriculture, mines and factories, but when it comes to making the dream a reality we are confronted with the fact that during the last half century the world has taken long strides forward and methods of transportation have been developing with it.

An experiment is now being made by the government, under the auspices of the War Department, to determine whether or not barge transportation on the Mississippi river between St. Louis and New Orleans is practicable and economical. The Illinois Central system is not opposed to this experiment in fact, we have been cooperating with it and are watching the outcome with interest. I believe we can safely be guided by the light of the government's experience. If we find that transportation by water on the Mississippi—or, for that matter, in any section of the country—is

more efficient and economical than by rail, the railroads, I believe, should not be forbidden, but encouraged, to use the waterways as auxiliary transportation lines. The railroads are already organized for and engaged in the business of transportation, and whenever and wherever water routes can be used effectively to lessen the cost of transportation or to make transportation more efficient, rail shippers, in my opinion, should be given the opportunity to benefit from the use of such water routes by the coordination of water and rail lines into a unified system of transportation.

It seems to be a pretty general experience that traffic fails to materialize for inland waterways in the volume anticipated by their advocates in seeking funds for building them. Two recent instances of that are the Erie Canal and the Hennepin Canal, one in New York, the other in Illinois, two of the leading industrial states of the nation.

The Erie Canal has been entirely rebuilt by the State of New York at a cost which makes the total investment in it close to a quarter of a billion dollars. It affords a toll-free, 12-foot waterway in a direct line of traffic between the Middle West and our greatest American port, passing through a region densely populated and intensely developed industrially. Nearly \$20,000,000 has been spent upon providing terminal and warehouse facilities. It is difficult to conceive a project carrying a great assurance of success, but what is the result of this vast expenditure?

The enlarged canal was opened in 1918 for its entire length and since then there have been four seasons of navigation in which to determine whether or not traffic will seek such a route when it is provided. In 1880 the Erie Canal, then only seven feet deep and in all respects a primitive trafficway, carried 4,608,651 tons of freight. In the four years of 1918 to 1921, its traffic grew from 667,374 tons of freight to only 993,639 tons. The money which has been spent upon the Erie Canal is equal to about 1.27 per cent. of the tentative

valuation placed upon the railroads of the country, but in 1920 the traffic of the canal was only about .065 of one per cent. of the tonnage carried by the railroads. When we consider the cost of maintenance and operation and the charges against the investment which the taxpayers of New York have to pay, we find that in 1921 it cost the taxpayers about \$7 for each ton carried on the Erie Canal, over and above what the shippers paid to barge operators. On the other hand, the total cost of transportation by railroad, including the cost of maintenance and charges for the payment of interest on borrowed funds and dividends on capital investment, is borne directly by the users of rail transportation service. Not only are the taxpayers freed from the necessity of building and maintaining the lines over which railway trains are run, but the railroads themselves are among the largest taxpayers in the country. In 1920 and 1921 they paid more than a quarter of a billion dollars each year in taxes.

The Hennepin Canal, which extends from the Illinois river at a point southwest of LaSalle to the Mississippi river at Moline, Davenport and Rock Island, has been built by the government at a cost of more than \$7,500,000. The cost of operation during the fiscal year ending June 30, 1921, was more than \$107,000. However, the traffic of 1921 was only 12,949 tons, and in 1920 it was only 7428 tons. Figuring interest on investment at only five per cent., this means that the taxpayers spent more than \$37 for each ton that was carried over the canal last year.

I do not believe it is because of any lack of business sagacity that men who are constantly seeking more economical ways of carrying on their business use the railroads in preference to these modern, well-equipped waterways. I believe it is because they have found the railroads more dependable and railway service more economical. Waterways in this climate are at a disadvantage. The season of navigation in New York and northern Illinois

averages less than two-thirds of the year.

Conditions under which traffic moves will not permit shippers to route their freight by water lines for two-thirds of the year and by rail lines for the other third. The railroads are under an obligation to do their utmost to provide facilities and equipment for handling the peak load of business, but it is not economical that they should equip themselves to handle the peak of fall and winter traffic, while much of their equipment stands idle during the summer months, when the inland waterways are in operation.

During the past half century the railroads have been built up to perform an intensified service. Rail lines of standard gauge extend into practically every town and hamlet in the country. A car loaded at the mouth of a southern Illinois coal mine, at the door of one of your plants or one of the thousands of other industrial plants, or on a siding in a small town of the great grain belt can be set down in any other part of the country without a transfer of cargo. Even though your plant may be located so that your products can be loaded directly into watercraft, only a small part of your territory can be covered by direct water shipments; somewhere in the line through which the bulk of your traffic passes there must be a haul by rail, making a transfer of cargo necessary. Once a freight car is loaded and moved out of the terminal the expense of moving it over the road is a small part of the total expense. Transfers of cargo add greatly to the cost of transportation. It must be evident, then, that the relative cost of transportation by rail and by water cannot fairly be measured by the charges made by rail and boat lines.

Over and above whatever saving some shippers might effect by using the waterways in spite of these handicaps, however, I regard it as distinctly unfair to tax all the people for the benefit of the limited few who can use the waterways. Furthermore, I regard it as unfair to the railroads to be compared with a transportation agency which is not

required to help in meeting the cost of providing, maintaining and operating an expensive traffic way.

Rail Development to Continue.

Some advocates of inland waterways contend that the rail carriers have reached a limit in their development and a failure to augment their facilities and equipment with water carriers will create a chronic transportation shortage. I believe that is not true. I believe the possibilities of rail transportation have only been touched, and the coming years will witness a greater development of railway transportation capacity than any of us now dream. There is no limit to the amount of business the railroads can handle, if they are given fair treatment by the public and permitted to grow. The only restrictions upon the amount of transportation service they can provide are the restrictions placed upon them by the public.

In referring to inland waterways, I do not, of course, include such waterways as the Great Lakes and short canals connecting great bodies of water, upon which conditions are favorable to a large traffic, and I do not oppose the use of inland rivers and canals wherever and whenever it can be demonstrated that they can be used successfully.

The losses and social disturbances caused by the strikes of coal miners and railway shopmen during the past summer have focused the attention of many thinking people upon the undesirability of strikes as a means of settling disputes between employers and employees.

Strikes are civil warfare. When any group of individuals attempts to force the public to accept its demands, without regard to their merit, it is a declaration of war against organized society. The fact that warfare may sometimes be waged in a righteous cause makes war none the less horrible. Likewise, the fact that strikes may sometimes be the means of enforcing meritorious demands does not hide their evil aspect.

Arbitrate Industrial Disputes.

There is no peaceful way of settling disputes except by the methods of arbitration. Arbitration is the

only way which has respect for the rights of both parties to the dispute and for the rights of the public. Recognizing this fact, we have established courts for the arbitration of the numerous individual controversies which spring from the relations of individual members of the community, and we are seeking to carry out the principle of arbitration in the settlement of international disputes. I submit that the principles must be applied to the settlement of industrial disputes which threaten to jeopardize the rights of the public.

A refusal to arbitrate matters in dispute implies either a selfish motive on the part of the individuals refusing arbitration, or else a distrust in the honesty and integrity of our people. I believe that we can rely upon the fairness of public opinion, when the public is given the facts intelligently, and I believe that any person or group of persons can obtain substantial justice by arbitration.

It has been the experience of the world that the crystallization of public sentiment must precede, not follow, legislation. We have had numerous instances in our own country of where legislation for which the public had not been prepared in advance has served to create disrespect for and evasion of law. Public sentiment must be aroused against strikes. The public must demand that disagreements between employers and employees engaged in fundamental industries such as railway operation and coal mining be settled by arbitration, and that both parties to the dispute, employers and employees alike, abide by the results. If our laws are oppressive they should be changed by the ordered process of law, and not by evasion, and so long as they are in effect they should be lived up to. Likewise, if injustice is done in the arbitration of industrial disputes, the wrong must be righted by a means which has respect for the rights of others.

The railway shopmen lost their strike this past summer because they attempted to jeopardize the interests

(Continued on Page 576.)

Many New Highways Being Built

DURING the present construction season the Pennsylvania State Highway Department, under great difficulties, has built 224.6 miles of new hard surfaced roads. Chief among the new roads opened in the Keystone state this year is the beautiful new Lackawanna Trail, between Scranton, Pa., and Binghamton, N. Y., one of the finest highways in the world and running through some of the most beautiful scenery in America. Altogether, there are 10,777 miles of state highways in Pennsylvania, of which 5000 miles are now improved.

Of the 10,777 miles of highways, 5378.87 miles are earth roads, 190.2 are gravel, 155.7 are of flint, 2089.5 are waterbound macadam with broken stone base, 828.3 are waterbound macadam with Telford base, 218 miles are of bituminous macadam and 115 miles are of bituminous concrete.

THERE are 68.16 miles of bituminous concrete with Telford base, 57.4 miles of asphalt with broken stone base, 70 miles of plain concrete and 1086 miles of reinforced concrete. The mileage of vitrified block roads is 383 miles, that of the wood block is 3.7 miles and that of the stone block is 4.5 miles.

Since the beginning of Governor William C. Sproul's administration the Pennsylvania department has completed approximately 1500 miles of new highways. This is a greater mileage of modern types of road than has ever been put down by an American state in the same period of time.

Operations of the Pennsylvania department during 1922, according to state highway officials, have been greatly interfered with by rains which, in their frequency, have rivalled the rains that interrupted the department's work during the forepart of the summer of 1919. The United States Weather Bureau reports that during the 82 days of May, June and July, this year, there was rain on 34 days.

Many Fine New Roads in New Jersey.

The New Jersey State Highway Department which has long set a pace for other states to follow and whose efficient chief engineer, T. J. Wasser, recently was elected president of the American Road Builders' Association, has let contracts this year for many miles of new roads that are being constructed according to specifications covering the latest and most durable types of pavement. New Jersey contracts let early this season provided for 22.6 miles of new highways. Roads of

this type are being constructed of 20 to 30 feet width, with shoulders, between Smithville and the Mullica river, Eatontown and West Long Branch, and Bridgeton and Millville and in the vicinity of Madison, Bridgeton, Newark, Bound Brook and Passaic.

There are in New Jersey 17,121 miles of roads, of which 6977 miles have been improved with hard surfaces, such as sheet asphalt, asphalt concrete, bituminous macadam, Portland cement concrete and other modern pavements. Of the total road mileage 40.7 per cent. is now hard surfaced. The mileage of hard surfaced roads in New Jersey is 7.7 per cent. greater than the percentage for the United States in general. The state also has two and one-half times as many roads per square mile of area as the whole United States.

New Jersey also holds the distinction of being the first state to adopt the policy of state aid with an appropriation of \$75,000 in 1891. The state is now spending about \$3,500,000 annually for roads and is contemplating a bond issue of \$40,000,000 more to be used as state aid in the future.

The largest new single road project undertaken by the New Jersey Highway Department this year is the eight-mile stretch of asphaltic concrete highway between Bridgeton and Millville.

Fine New Roads for Tourists in Florida.

In anticipation of a record-breaking number of motorists from every state in the Union touring Florida next winter the highway officials in that state are pushing this year's road building programme with all

possible speed. According to C. E. Hunt, who supplies touring information for the Jacksonville, Fla., Auto Club, northern and western motorists sojourning among the Everglades next winter will find road conditions greatly improved, owing to the construction of a large mileage of hard-surfaced roads, and the tourist will be able to do his daily 150 miles in comfort, since Florida will have, by the opening of the winter season, 5000 miles of surfaced roads.

One of the greatest winter tours and the longest marine drive in the world are combined in the famous Dixie Highway from Jacksonville down the east coast of Florida, through St. Augustine, Ormond, Daytona and Palm Beach, to Miami, a distance of 377 miles, all of which will be in good shape for winter touring. The route skirts the Atlantic ocean and Halifax and Indian rivers for more than 300 miles, following the line of the Florida East Coast Railway between the railroad and the water for about 200 miles.

The first stretch of the line from Jacksonville to St. Augustine, 41 miles, has paid its original cost many times over in returns to the State of Florida and is pointed out by progressive good roads enthusiasts as an example of the value of good roads. With the exception of the first nine miles which is shell, the road is of brick, with asphalt filler, 10 feet wide. At a meeting of the Florida State Road Commission at Tallahassee in July the road from the Duval county line to Bunnell was taken over by the commission and gangs are at work putting this section of the Dixie Highway in

good shape for the winter visitors.

By the latter part of October, however, motorists will have an alternate route from Jacksonville over the beach route, a natural speedway 300 feet wide at low tide. Cars can run down from Jacksonville to Pablo Beach, opposite St. Augustine, a distance of 30 miles. A bridge is under construction between North Beach and St. Augustine and will be finished in October, enabling motorists to use the beach route. From St. Augustine the road leads inland to Hastings and thence southeast to Bunnell, a distance of 28 miles, from which a new road has been completed into Ormond via Ocean City. The road between Ormond and Ocean City has been greatly improved and work is now in progress there according to E. W. Simpson of Ocean City. At Ormond the motorist can try out the 30-mile Ormond-Daytona speedway, a famous course 500 feet wide at low tide, where many auto records have been made.

A splendid road runs for eight miles beyond Daytona, the motorist having enjoyed brick or asphalt roads almost continuously for 112 miles. For the next 120 miles the road is shell. Between Vero and St. Lucie this road has been widened and is now in good shape, according to George F. Tippin, secretary of the Vero Chamber of Commerce. The road north to Valkyrie is in better shape than formerly.

Two Schools of Highway Engineers.

Road building is being done far more scientifically now than it was a few years ago. There are two schools of engineers who still disagree as to what material will make the best road. One school advocates the rigid pavement to withstand the impact shocks of heavy traffic and the other school believes that a cushioned pavement is best.

The asphaltic concrete pavement fits the theory of the engineers who advocate a resilient shock absorbing pavement and the cement concrete pavement meets the views of those who favor the rigid pavement.

Canada Spends \$50,000,000 on Highways.

Fifty million dollars will have been spent on improving Canada's highways, many of which are of the asphaltic or resilient types, when the five-year period terminates in the fall of 1923, according to reports received by A. W. Campbell, Dominion commissioner of highways. Of this total \$20,000,000 will have been appropriated by the Dominion government and the remainder by the different provinces. Of the Dominion sum there is yet \$800,000 to be taken up by the provinces.

Agreements have already been entered into by the Province of Ontario calling for an expenditure of \$12,500,000 by the end of 1923, of which sum \$5,000,000 is the Dominion share.

The New Brunswick government now has all of its appropriation of \$3,000,000 under agreement, the Dominion government contributing \$1,200,000. A total of 1595 miles of highways are scheduled for improvement.

Alberta, the last province to take part in the Dominion highway scheme, has just filed for approval plans for road improvement under the Canada Highways Act. All of the provinces are now working under the general regulations provided by this act, and the work throughout the provinces is being carried out in accordance with uniform standard specifications.

Australia Studies American Roads.

With a view to exercising proper care in adopting its new road building programme, the Australian government has sent D. V. Fleming, engineer of roads and bridges for South Australia, to this country to study American highways, particularly as to the cost of laying the different types of pavements, durability, maintenance costs, drainage and grading.

Australia is contemplating an extensive road building programme. Several contractors from Brisbane, Sidney, Melbourne and other points have also been in this country during the summer months studying

American highway construction

Mr. Fleming states that grave need for new roads exists in Australia because of the rapid development of automobile and truck traffic. There are very few hard surfaced roads in the country at the present time.

North Carolina Highway Department Uses Radio.

North Carolina, the chairman of whose highway commission is Frank Page, one of the live wires in the road building field, and whose chief engineer, Charles M. Upham, is known far and wide as one of the most progressive, resourceful and wide-awake road building experts in the country, have installed in the offices of the North Carolina State Highway Commission at Raleigh, a radio broad-casting station and in each of the nine district offices a receiving station to enable their administrative forces to keep in closer touch with their construction and maintenance engineers. The district offices are at Tarboro, Kinston, Wilmington, Durham, Greensboro, Charlotte, Elkin, Marion and Asheville.

The wireless equipment was obtained from the government as a part of the surplus war material allotted to the states for road building purposes. While the North Carolina department is the pioneer in the use of the radio, other states are now clamoring for similar equipment and the wireless telephone promises henceforth to be an important factor in expediting the great road building programme now under way in this country.

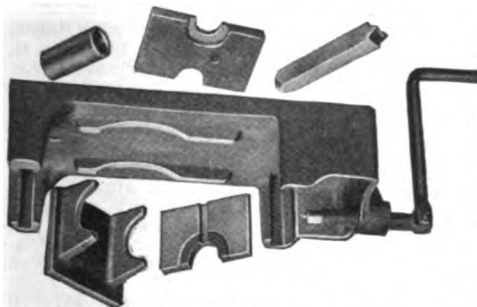
Method of Paving Bridge Floors.

In order that the probability of fire on the great Victoria bridge, Montreal, Quebec, might be reduced to a minimum, it was decided in reconstructing the floor, to surface it with two inches of sheet asphalt. In addition to reducing the fire hazard, the maintenance cost, as compared with the old wooden floor, has been greatly reduced. This novel method of treating a bridge floor is proving quite popular in Canada.

(Continued on Page 576.)

ACCESSORIES DEPARTMENT

Miles Generator Tool is a complete tool for assembling and disassembling Ford generators, states the manufacturer. This tool holds the generator for driving out the pinion pin rivet, also for replacing the pin and riveting it. It forces the shaft out of the pinion, forces the pinion back onto the shaft and also forces the



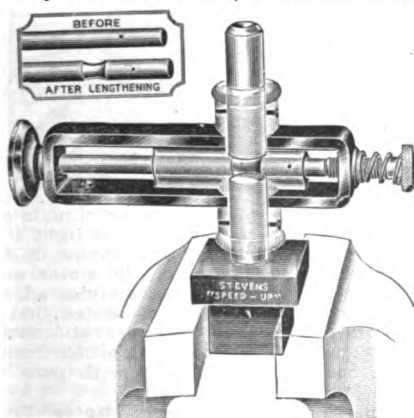
shaft out of the ball bearings, replacing it without injury. It takes the screws out of field coils and replaces them without injury to the slots in the screws.

All of these operations are made possible by a frame with slotted or grooved standards and a screw. The grooved standards receive plates with different size and shape of slots, which hold and protect the different parts when forcing them off and on. Without this tool, states the manufacturer, it is nearly impossible to do this work, especially taking off the ball bearings. Most of them fit very tight and without some form of puller the liability of breakage is great.

This tool bolts to the place desired, is rigid, compact, complete and perfect, and is a necessity in every shop where generator work is done states the maker. Price, \$12.

Manufactured by Zinke Company, 1323 Michigan Avenue, Chicago, Ill.

Valve Stem Swedge is the only tool that will lengthen the stem and at the same time prevent distortion, states the manu-



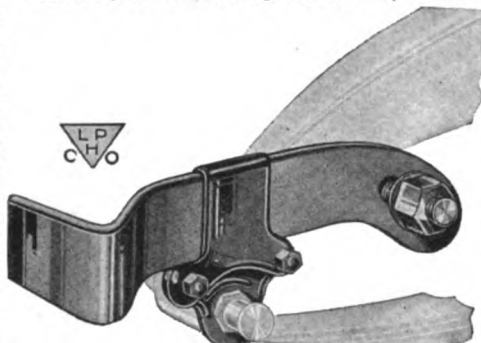
facturer.

The required amount of lengthening is first measured by inserting a thickness gauge between the end of the valve stem and the tappet. After the valve is put in the swedge, the adjusting screw on the swedge is set according to the thickness gauge.

A few sharp blows, struck as the valve is being slowly rotated, will stretch the valve to the desired length. This swedging does not damage the valve for the slight depression is below the working surface of the guide. The maximum lengthening permitted is up to 1/16 inch, which is more than is ever needed. The weight of the Valve Stem Swedge is two pounds, three ounces. Price, \$3.

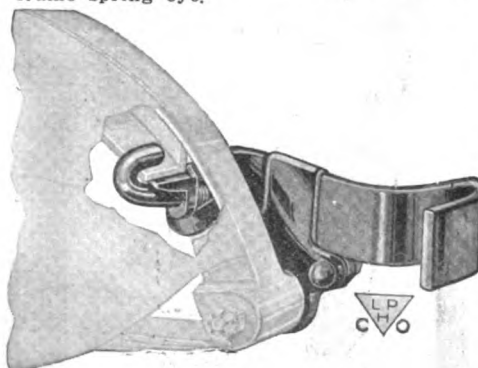
Stevens and Company, 375 Broadway, New York City, N. Y.

Halladay Spring Bolt Bumper Fitting is easily attached to the car, all that is necessary is to jack up the frame, which



relieves the front springs of the car weight.

Place a block of some description between the frame and the spring, holding the spring in its original position to the frame spring eye.



Remove the spring bolts, slip the fitting over the bolts and replace.

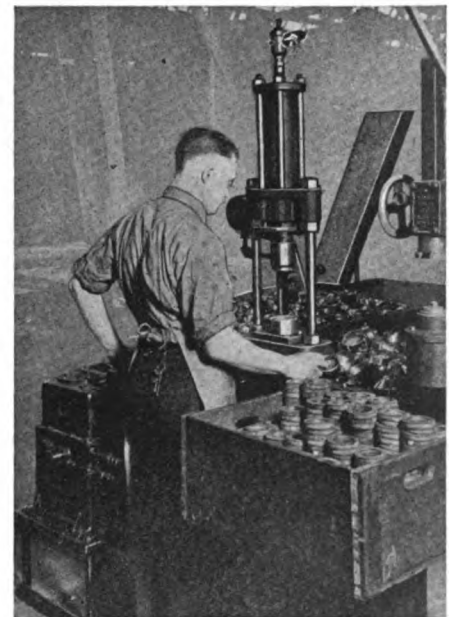
Place the hook bolt on the lower flange of the frame; place on the hook bolt, the wedge clamp, and place bolt in slot of fitting arm, adjusting so that the arm is standing parallel with the car.

The arm may also be adjusted back and forth in the spring bolt clamp so as to carry the bumper from the tire at whatever distance desired.

Draw the hook bolt up securely and see that the clamp is also tightened securely to the arm. Then attach the bumper bar to the arm in the usual way.

Manufactured by L. P. Halladay Company, Decatur, Ill.

Oilgear Bench Press used principally for inserting fiber rings into metal caps for Ford timers has met with the approval of the repair shop trade and as a result has been sold extensively. According to the manufacturer it is quite a relief for the operator who has used old fashioned methods to work with the newly developed Oilgear press as no muscular effort is re-



quired by the new method and the work besides being much better done is accomplished in a fraction of the time formerly used by the old hand method.

A pressure gauge, clearly visible, shows the amount of pressure necessary to press the ring into place in the cap and this particular feature is one of the most important in that it shows whether the ring has been made too large or too small.

Too low a pressure reading means that the ring has been made too small and will work loose from the cap, whereas too high a pressure reading means that the ring will not force into place without disturbing the exact circumference in a manner that will give poor results.

Manufactured by the Oilgear Company, 60-62-64 27th Street, Milwaukee, Wis.

(When Writing to Advertisers, Please Mention the MOTOR TRUCK.)

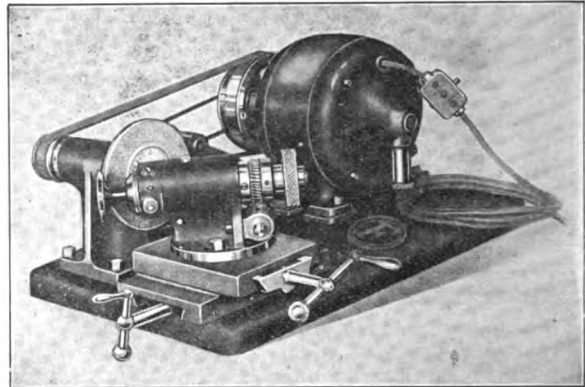
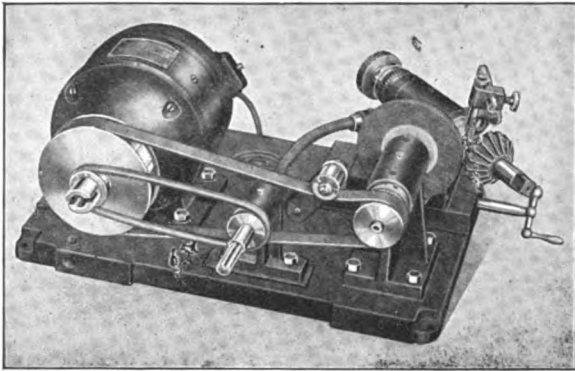
Franklin Grinders grind a set of valves and do it right with the angle absolutely correct and the finish as smooth as velvet, states the manufacturer.

Briefly described the Franklin consists

by means of a long flat belt to prevent vibration.

A swiveled head fitted with draw chucks to hold the valves or cutter pilots, is mounted on the compound slides. These

by a worm and worm wheel by means of a flexible shaft arrangement. Slides are scraped in and fitted with adjustable gibs to take up for wear. Spindles are accurately ground to fit bearings in a manner



of a flat base with a 1-4 horsepower motor attached, a grinding wheel running in a bronze bearing and rigidly fastened to the base, and a motor driving the wheel

slides are operated by feed screws for moving work up to and across the face of the wheel.

The spindle in the swivel head is driven

that guarantees precision.

Manufactured by Franklin Machine and Tool Company, Incorporated, Springfield, Mass.

Lomar Shock Absorber, although just being introduced to the public, has been on test on thousands of cars in all parts of the country for the last three years.

It has proven a success and today it is a mechanical and commercial proven success.

It combines stately, attractive appearance with the maximum effectiveness in shock absorbing and lasting qualities.

It cannot rattle and there is nothing to wear out nor anything requiring adjustment or attention once it is installed, states the manufacturer.

and flows back by gravity, lubricating all working parts. This is a pronounced feature, inasmuch as all extension lubricating devices are eliminated, giving a dust-proof enclosure for all working parts of the absorber. The cam works on a roller bearing on the upper piston, which allows it to act or respond perfectly on the slightest jar or motion.

The standard finish is black enamel with nickel trimmings.

Manufactured by the Lomar Manufacturing Company, Middletown, O.

Cylinder Auto-Hone enables the repair shop operator to do cylinder resizing and honing at a fraction of the cost and in less than a quarter of the time required by certain resizing methods. To operate one simply slips the Auto-Hone into the cylinder, connects it with your electric drill, turns on the power and the work is started.

Fifteen minutes honing corrects the usual five to seven thousandths out-of-bound or tapered cylinder, according to the manufacturer. The average job is completed in less time than it would take to dismantle a motor and to remove the cylinder block from the chassis. This de-

vice, it is claimed, does away with taking down the motor, carting the block to the grinder and waiting the grinder's convenience. It also gives the cylinders a smoother finish than has ever before been possible except by the long, tedious process of lapping.

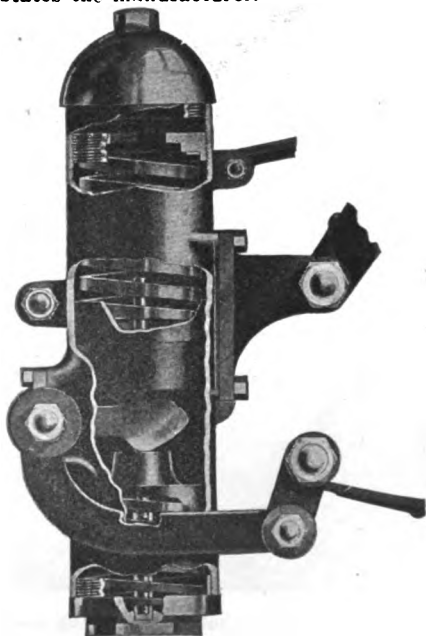
The Auto-Hone comes packed in a substantial hardwood box with hinged cover. Full directions for its use are inside the cover. There are just two parts, the Auto-Hone itself with stone in place and the driving handle for attaching to the electric drill.

This device, tested thoroughly by the manufacturer before being packed, is guaranteed to be free from defective material and workmanship and is thoroughly accurate.

Manufactured by Auto-Hone Company, 1587 Main Street, Buffalo, N. Y.

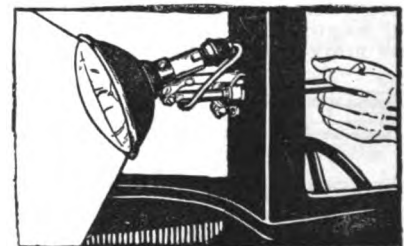
Hayes Pathfinder embodies all of the features of the more expensive lights, states the manufacturer. The reflector is coated with pure silver, which results in a concentrated white beam of light. All its parts are full nickel on brass, which prevents rust and the shell is a rich dull black enamel.

Any adjustment of the Hayes Pathfinder can be made from the driver's seat without lowering the window of the closed car and without reaching through the curtains. The light may be turned to any desired position by a simple twist of the wrist. With this light the driver can find house numbers, pick out the danger-



The absorber consists of a strong cylinder entirely enclosed at either end, eliminating any dust or dirt that might wear the working parts. Two arms that terminate in a cam within the cylinder are attached to the automobile spring with the regular spring shackle bolt. The cam operates between two pistons, which are separated from the ends of the cylinder by properly adjusted special alloy springs. The upper spring absorbs the shock and the lower absorbs the rebound.

An adjustment nut screwed into the top of the cylinder enables one to vary the resistance of the main spring and regulate it to the exact load to be carried. One-half pint of heavy oil poured into the cylinder is pumped to the top of the absorber



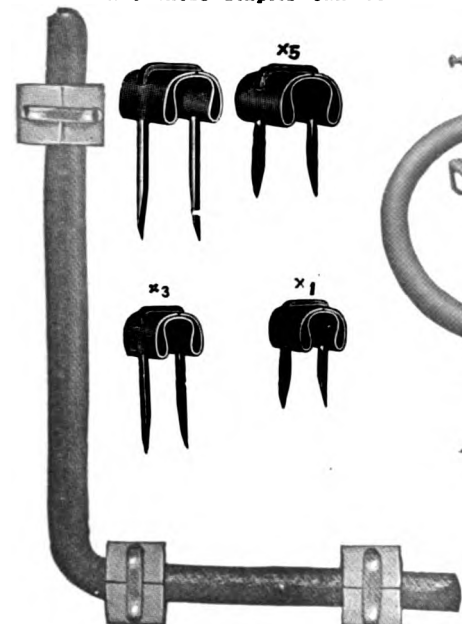
ous side ditches, read danger signals and road directions, get a reflected light from the road sufficiently to make a tire change, or tilt it down on the motor when the hood is raised, to make minor adjustments. The manufacturer states that at all times it affords a powerful, concentrated, white beam of light, which results from coating the reflector with pure silver. Price, \$8.50 complete.

Manufactured by Hayes Motor Truck Wheel Company, Jackson, Mich.

(When Writing to Advertisers, Please Mention the MOTOR TRUCK.)

Blake Insulated Staples give perfect protection to the insulation on the wire as no other staple or single prong fastener does, states the manufacturer.

The double thickness of insulation, under the head of the staples, gives a large surface of contact with the wire, to stand mechanical strain, and it is also stated that these staples can be driven



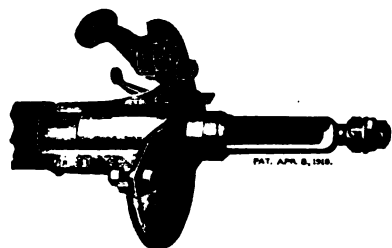
over two or more wires without danger of causing a cross.

The insulation on the Blake Insulated Staples gives an added protection from leaks on grounds on the wiring. When used in damp places it also protects the braiding on the wire from rust or corrosion of the staple. When stringing long runs of wire the end staples will hold the slack until the wire is secured at intermediate points.

Blake Signal & Manufacturing Company also manufactures the Blake Compressed Cleats, which are designed for use on all low voltage circuits of interior wiring. There is no breakage in the use of these compressed cleats, as in porcelain cleats. They will not break under the blow of a hammer and wire nails can be used for attaching as well as screws.

Manufactured by the Blake Signal & Manufacturing Company, Boston, Mass.

Shambaugh Emergency Spindle is made of solid steel hollowed out so that it slips over the Ford rear axle shaft states the manufacturer. The Spindle is held within the axle housing by a steel retainer that is bolted through the hole that holds the brake shoe to the axle housing flange.

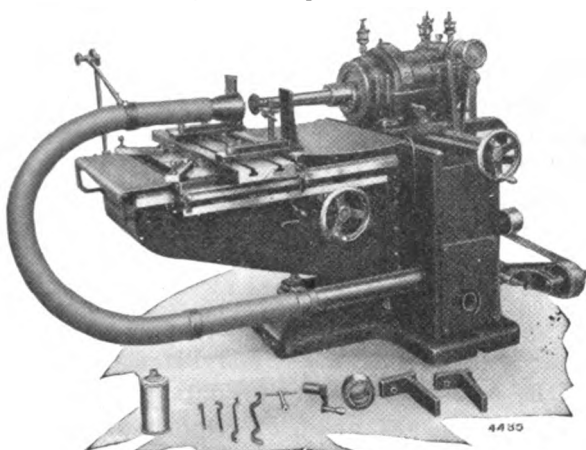


Some of the important features of the Shambaugh Emergency Spindle for Fords is that the disabled car will have the same height as under normal conditions. The tread is practically the same, which is of great importance on bad roads. The wheel runs on ball bearings, preventing cutting out and requires no attention. Shock absorbers and other accessories do not interfere with its proper functioning. The price of the Shambaugh Emergency Spindle for Fords is \$6.50.

Manufactured by Shambaugh Manufacturing Company, Lafayette, Ind.

Madison Cylinder Grinder is constructed for grinding and regrinding cylinders generally; it also may be used on other work varying considerably in shape and size.

The wide range of adjustment and the standard equipment furnished with the machine make it possible to handle various types of single, double, four or six-



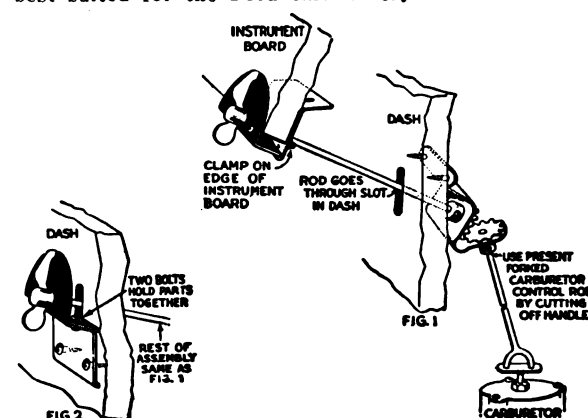
cylinder enbloc castings, it is claimed by the manufacturer. Cylinder blocks, of the small motor type of 2 1/4-inch bore, up to those of an eight-inch bore, 16 inches deep, can be ground without special fixture of resetting the block. The headstock and grinding spindle are mounted on a transverse adjustable carriage and are driven by endless belts or springs.

To increase or decrease the throw of the eccentric, the adjustment may be made either by power or by hand. The power adjustment to the throw of the eccentric may be operated by a simple movement of a controlling lever. Hand feed is provided for rapid adjustment. Graduate dials are provided for both hand and power eccentric feed adjustments. The work carriage slides on dust protected ways of a vertically adjustable knee. The ways of the knee are far enough apart so that, when grinding cylinders, the cylinder block is at all times either between or directly over the ways. The machine being universal in its adjustment, is easy to set up for the work, and is accurate and rapid in its operation.

The Madison Cylinder Grinder is entirely self-contained and includes fan, belts and other necessary equipment. It may be driven by a countershaft or by a motor the manufacturer states.

Manufactured by the Gisholt Machine Company, Madison, Wis.

Imperial Carburetor Control shows by a dial on the instrument board just where the needle is set, indicating the mixture best suited for the Ford car. Every one



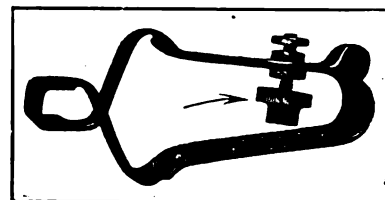
realizes how awkward and inconvenient it is to adjust the carburetor on the aver-

age Ford. It is situated at the base of the dash and there is no way of knowing the degree of adjustment or whether a lean or rich mixture has been effected. The Imperial carburetor control illuminates all guess work and makes it easy for the owner at all times to adjust his carburetor correctly.

Dealers who handle this article of equipment state that it has sold readily and has found quick favor with the Ford owning public. It is easily attached in a few minutes without drilling or cutting either the dash or the instrument board. A pair of pliers, a file and screw driver are the only tools needed and one does not have to be a mechanic properly to install it.

Manufactured by the Imperial Brass Manufacturing Company, 1200 West Harrison Street, Chicago, Ill.

Handy Battery Clip, known as the "clip with the lock jaw grip," is designed to offer a trouble-proof easily attached clip for attaching the battery lead to the terminal. The manufacturer states that regardless of the action of acid on the teeth of the clip and the battery post there is no chance of the clip loosening, neither will it work loose through vibration as it bites into the lead and holds its position until released.



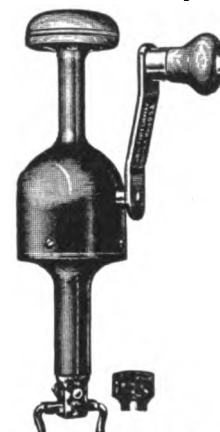
As will be seen from the illustration this clip depends for its pressure on its spring as well as on the knurled thumb nut which is screwed against the side of the clip, thus locking the jaws to the battery post at any tension desired.

Manufactured by Handy Products Company, Cleveland, O.

Goodell-Pratt Valve Grinders make valve grinding much easier, more effective and more economical. The use of this tool saves both time and energy; two expensive items in motor maintenance.

The back and forth movement necessary to obtain a perfect valve seat, is caused by a simple mechanism actuated by a continuous rotation of the crank. The cast iron casings, in which the simple working parts are inclosed for protection, gives to the tool sufficient weight so that no additional pressure is needed to accomplish the best results.

Each tool has a polished hard wood crank handle and a hard wood head, the frame being nicely finished in red and black enamel. In order that the tool can be used on any type of valve, an adjustable spanner and a blade are provided.



Manufactured by Goodell-Pratt Company, Greenfield, Mass.

(When Writing to Advertisers, Please Mention the MOTOR TRUCK.)

F. W. D. Power Plant Used in Pullman Cars

JUST how far the manufacturers of gasoline railway equipment can go in the development of light cars and trains for the practical and efficient replacement of heavy trains, is a question.

Rapid strides have been made along this line in the past year or two and the rail car has proven to be the correct solution of transportation difficulties on many short lines where traffic is light and steady losses have been sustained through the operation of steam trains.

To a large extent, manufacturers have thus far confined their efforts to the single car unit, either building bodies right on the chassis or building semi-trailer bodies, the front end of which are mounted on the power units. These methods have worked out very well, indeed, but in many cases they do not meet the requirements of the operators. For instance, a single car unit may be large enough to handle ordinary traffic on a particular railroad, yet at times during the season when traffic is heavier than usual and the capacity of the single car is inadequate to handle the rush.

GOING a step farther than the single car gasoline railway unit, the Four Wheel Drive Auto Company, Clintonville, Wis., has developed a two-car gasoline railway train equipped with all steel bodies built and mounted by the Pullman Company of Chicago, Ill. This train has just been completed and is being used for demonstration purposes at Chicago.

The bodies are finished in true Pullman style throughout and are capable of handling 46 passengers and baggage. The forward car of the train is the power unit and is divided into two sections, one being reversed for a baggage and motor-man's compartment and the other section equipped to carry passengers and to be used as a smoking section.

The rear car is devoted entirely to the accommodation of passengers. It contains 16 seats and accommodates 32 passengers very comfortably. The interior finish is of a high grade and reminds one a good deal of the modern railway coach. Necessary precautions have been taken in the insulation of the bodies so that vibrations and their attending noises are not communicated to the interior of the cars. A greater comfort is provided passengers through this arrangement than with the uninsulated body.

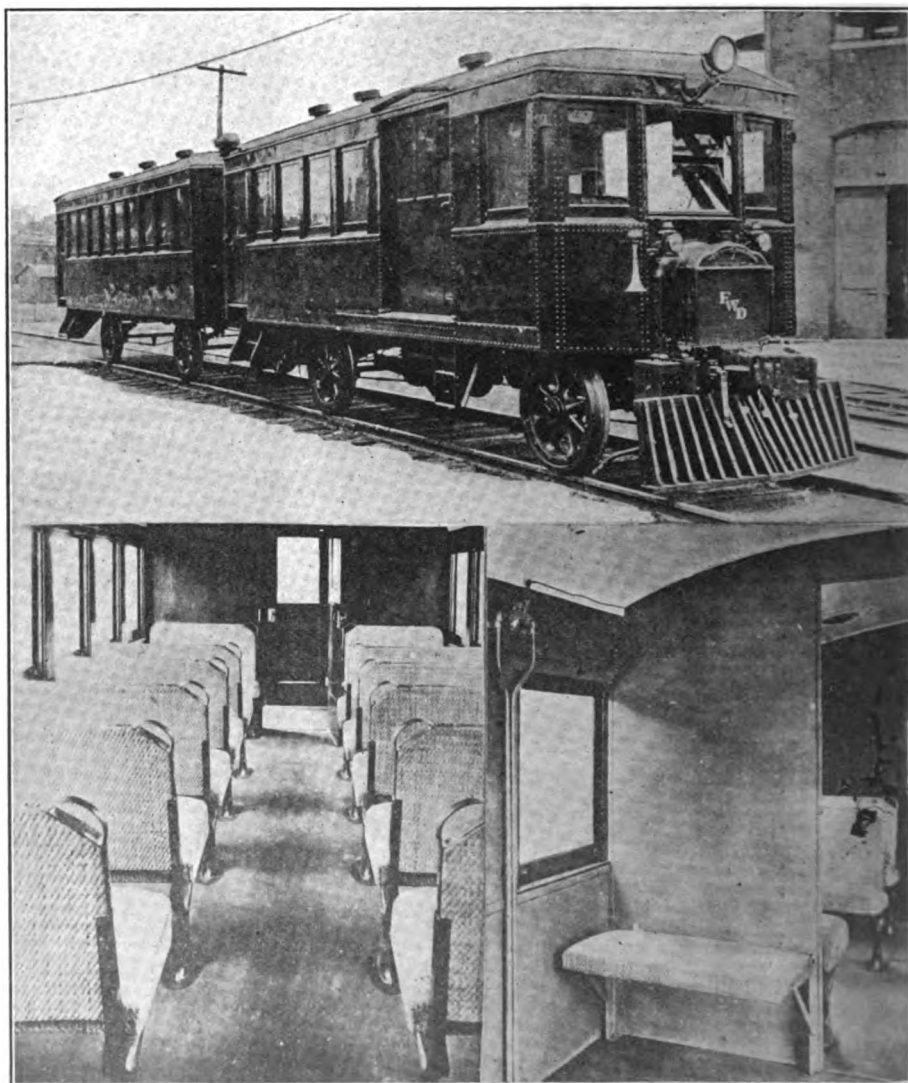
With buses equipped with pneumatic tires and operated on the highways, most of the jars and vibrations are absorbed by the tires and springs, but when operated on rails and with the steel wheels meeting the steel rails, the jars when crossing rail joints and the noise of the vibration can only be partly ab-

sorbed by the springs; the remainder is transmitted to the body. Hence the necessity of body insulation to insure the maximum of comfort to passengers and a longer life to the equipment. Among other modern devices this train is equipped with air brakes on both cars, M. C. B. couplers front and rear, electric

starting and lighting devices, heating attachment which is coupled to the motor exhaust, a sanding device for sanding the rails, a powerful searchlight mounted on the forward car to be used for night running, and a locomotive type cowcatcher.

Although there is no indication at

(Continued Third Column Next Page.)



This Two-Car Gasoline Operated Railway Train Is Equipped with All-Steel Bodies Built by the Pullman Company of Chicago.

Complete Novel Test House

PROBABLY the largest and most complete test house of any automobile or truck manufacturer in the country has just been completed by the General Motors Truck Company.

The trucks will be tested in the factory for gasoline consumption, ignition, carburetor adjustment, oil distribution, water circulation, speed, horsepower developed at the rear wheels and for friction in all sections of the chassis.

Sufficient blocks have been installed to give the factory a testing capacity of 100 trucks daily. Every instrument known to modern automobile engineering science for the testing of automobiles has been installed.

THE trucks when they come off the assembly chain and are passed by inspectors are run to the test house, only a few feet away from the end of the chain, and run on to one of the blocks. The front wheels are held in place by automatic jacks which catch as the rear wheels are driven up on to two rollers, and the jacks in front are so placed they can accommodate any wheel base desired.

The rear wheels of the truck rest on the two rollers, which are connected and driven for friction test by a 50-horsepower electric motor in a gallery just below the floor. These motors, in addition to driving the wheels of the truck on the dynamometer test block, are dynamos, and generate electricity when the truck motor is run, which in turn is sent through electrical apparatus and carried back into the factory, where it is converted into use as power.

At the left of the truck on the dynamometer are the test instruments and control board. A visible gasoline tank is also connected with the truck and the pipe runs directly to the carburetor line. The glass tank is marked off in half gallon units so that an accurate check of the consumption can be kept. This tank is filled automatically from above by simply pulling a chain, which is connected with a pipe to a main tank, supplying all blocks.

In front of the truck is a swinging hose, suspended from the ceiling so that water can be replenished in the radiator at will.

A check is also kept on oil consumption in the same manner the gasoline is watched.

A metal hose is attached to the exhaust pipe of each truck and this is run down through the floor and exhausted into the air through separate ducts. Also, in order to avoid engine gases, there is installed over each test block a ventilator, which can be opened or closed at will.

Above the control board at the left of the truck is a speedometer, showing the miles per hour a truck is being driven, the miles it has been run, and this is used in connection with the checking up of gasoline and oil mileage. This speedometer is driven by a flexible shaft leading to the main drive shaft of the rolls.

Also, just above the controls, is an automatic chart which shows the relation of friction to speed, whether it be in high or low range of the transmission and in reverse as well. It also shows the friction in the motor, which can be run in direct drive at high gear without firing and driven by the dynamometer motor, through the rear wheels.

Again, this chart shows the power developed by the motor as it is tested out, firing, in all three speeds and reverse, and an automatic red ink pen marks the fluctuations of the power on ruled paper, which is controlled by clock arrangement.

Below this chart are the controls which slow or speed up the dynamometer at will and safety devices for protection.

Suspended from the ceiling at the rear of the truck and directly over the cross member in the frame is a jack, with an automatic recorder, by means of which the load, corresponding to actual road tests, is applied. This jack is controlled by compressed air, and by turning a handle

it is possible to apply a load from one to 10 or more tons, directly over the rear wheels.

The rollers on which the rear wheels rest are so constructed that the factory engineers say that a road condition with the exception of the bumps is maintained.

J. A. Murray, GMC works manager, and F. A. Whitten, chief engineer, maintain that tests with this equipment are the best possible tests that could be given a motor truck.

F. W. D. POWER PLANT.

(Continued from Preceding Page.)

the present time of the gasoline rail unit ever being used to replace the steam locomotive in heavy duty service, the place which the motor car does hold in the efficient and profitable operation of railroads is fast becoming recognized.

Manufacturers are continually adding to their equipment—making improvements here and a little change there so that it will be better able to handle the work for which it is intended.

If the operator meets a little difficulty now and then the manufacturer is on the job to assist in overcoming it. If the manufacturer's car does not meet the average operator's requirements, he makes the proper changes in its design. In short, the railroad officials' problems are fast becoming the problems of the automotive manufacturer and, if given a little time to perfect a few of the finer details of his equipment, it is a safe bet that the manufacturer of automotive equipment will do his share in meeting the short line railroad situation in a practical and efficient manner.

RUBBER EXPORTS LARGER.

THE HAGUE, Oct. 19.—The Secretary of the Trading Company at Medan, Sumatra, reports that rubber exports from Java, Sumatra and Ceylon rose from the first half of the year 1921 to the first half of the year 1922 from 103,000 to 152,000 tons, the corresponding figures for direct exports to the United States being 43,000 and 104,000, respectively. During last July Sumatra rubber exports were 3900 tons, of which 2700 were direct to the United States. The exports of the second half are likely to be larger.

Some Dutch rubber companies have effected forward sales of the 1923 crop.

SERVICE.

(Continued from Page 538.)

tirely satisfactory. The manufacturer of this truck was in no way to blame and yet the writer has been informed by this owner that never again will he purchase another truck of this make, simply because of the poor service given.

Isn't it about time that cognizance was taken of the marked influence of service from a sales standpoint by the truck manufacturers; isn't it time that this important fact was given the consideration that it so rightly deserves if the industry is to continue to progress? In view of a rather careful survey of the actual facts as they exist at the present writing we believe that it is.

MANY NEW HIGHWAYS.

(Continued from Page 570.)

To provide for the effect of vibration of the bridge and also for the effect of heavy traffic and weather, an unusually dense mixture of asphalt was adopted, care being taken to lay it with sufficient resiliency to meet the traffic conditions. Consequently, a high percentage of bitumen for plasticity and a maximum amount of filler for stability was specified. After a good deal of experiment it was found that 13 per cent. of asphaltic cement was excessive and finally 11.6 per cent. was adopted. The new bridge floor has now been giving excellent service for two years without additional cost for maintenance.

Philadelphia Builds 94 Miles of New Streets.

During the past two years the city of Philadelphia, Pa., has paved 75 miles of streets and is rapidly completing 19.5 miles more. The additional 19.5 miles of paving will be laid on 140 streets and avenues in various sections of the city. In Broad street, Philadelphia has long been recognized as having one of the finest asphalt streets in the country.

According to F. C. Dunlap, chief of the Philadelphia Bureau of Highways, an analysis of all the city's sheet asphalt pavements indicated that more than 50 per cent. are more than 15 years of age and in view of

many such records and the city's experience with other types of construction, the bureau has adopted sheet asphalt and granite block as standard types for the most heavily travelled streets. In New York City paving on all heavy traffic streets now is restricted to sheet asphalt and granite block with asphalt filler. In addition, all cuts and openings in the pavement of Fifth avenue, recognized by engineers as the finest paved thoroughfare in the world, are being repaired.

TRANSPORTATION PROBLEMS.

(Continued from Page 568.)

of the public and overthrow decisions of the United States Railroad Labor Board, regardless of the merits of their demands. In the end they found it necessary to go back to work and take up their grievances in the manner provided for the settlement of such disputes, of which they could have availed themselves without a resort to force and without creating a national upheaval.

Education in Economics Vital.

I am fairly appalled by the enormous amount of insidious propaganda that is being distributed among the workers of the country for the purpose of fomenting strife and unrest. Our working people must be educated if we are to overcome the effect of this campaign to destroy American principles and American government. I cannot place all the blame for this situation upon the labor unionists, for the public generally needs nothing more than it needs a schooling in the fundamental principles of economics. We fall easily into habits of loose thinking, the consequences of which are disastrous.

Our civilization as it stands today—and it is far better than any other the world has ever known—rests upon the principle that we are all members of a community in which each one of us attempts to perform his share of the work of the community, and in return receives the satisfaction of fulfilled wants accordingly as he contributes to fulfilling the wants of others. The doctrine that one of us, or one group of us, can prosper by beating down

someone else or some other group is the most harmful theory ever devised and turned loose upon the world. We prosper only as we help others to prosper.

J. A. RITCHIE GOES TO NEW CHICAGO BUS CO.

YORK, PA., Oct. 11.—J. A. Ritchie, president of the Fifth Avenue Coach Company since 1918, and prior to that time with the Interborough subway, has resigned his position to go to Chicago, where he will become president of the reorganized Chicago Motor Bus Company. (A detailed account of this reorganization will be noted elsewhere in these pages.)

PROPOSED DIVIDEND BOOSTS STOCK.

NEW YORK, Oct. 10.—Sensational gains in the prices of shares of companies in the Standard Oil group during the past week in response to the announcements of proposed stock dividends by two companies and rumors of such action by several more, have resulted in an appreciation of nearly \$1,000,000,000 in quoted values above the low prices of the year.

This remarkable increase, without precedent in the annals of Wall street, is the result of extensive speculation, which has extended to shares of other oil companies and of concerns holding large corporate surpluses.

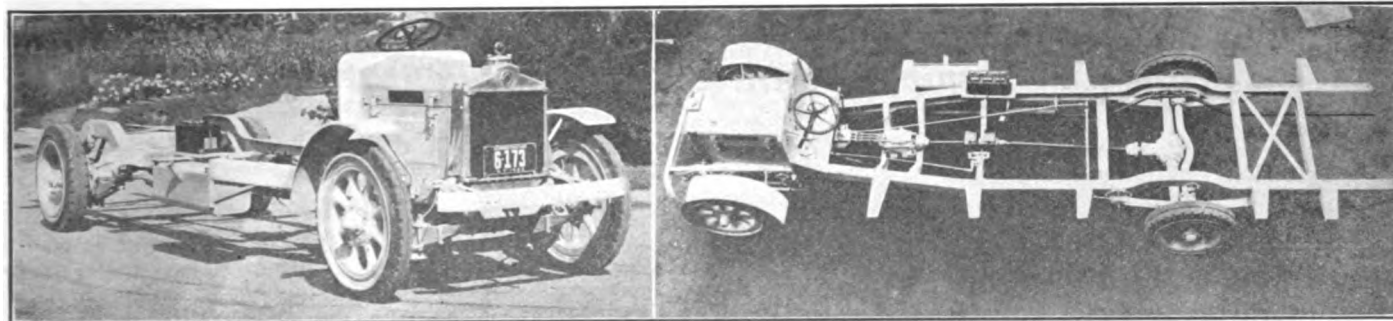
Shares of the Standard Oil Company of New Jersey, at today's closing price of 233 shows an increase of \$255,000,000. The market value of the Standard Oil of New York, at its high of today, showed an increase of \$275,000,000 above the low of the year, while Standard Oil of Indiana has added more than \$150,000,000 and Standard Oil of California, \$140,000,000 to their quoted market values.

All of the other 33 units, which were split up by a decree of the United States Supreme Court in 1911, also show substantial increases, the quoted value since that time having increased \$3,000,000,000. Since the dissolution the various units have distributed more than \$1,000,000,000 in cash dividends, while the stock dividends, exclusive of those announced this year, have a market value of an additional \$1,000,000,000.

John D. Rockefeller is reported to have owned 30 per cent. of the stock at the time of the dissolution decree. He is known to have disposed of a large part of his holdings to other members of his family, but had he held his original shares they would have increased approximately \$1,000,000,000 in 11 years of which nearly \$400,000,000 would have been added this year.

The surplus account of the Standard Oil Company of New Jersey was \$594,525,562 as of Dec. 31. The Atlantic Refining Company holds the record for the largest surplus in proportion to the stock outstanding.

The Goodwin-Guildler Motor Coach



Unusually Easy Riding Qualities Combined with Economy of Operation Makes This Newly Designed Passenger Carrier Ideal for Passenger Transportation.

UNUSUALLY easy riding combines with economy of operation to make the Goodwin-Guildler 25-30 passenger motor coach a vehicle that meets with the favor of the bus operator. This product not only is easily handled and is economical as to consumption of fuel, but is said to be very speedy and of unusual durable construction.

The floor of this bus, due to its special passenger design, is but 18 inches from the curb, all of which makes for good balance and passenger comfort. Long flexible coach springs are used, which together with the cushion wheels and semi-pneumatic tires gives it riding qualities which are not approached by buses of certain types now on the market.

Walter C. Guildler, designer and engineer in charge of production, has been engaged in transportation motor design and construction for 16 years, having been with many well known builders of trucks and it is to his extensive experience that the many good qualities of the bus are due.

The specifications of the motor coach are as follows:

Power Plant—Buda EBU special coach motor, three-point suspension, aluminum crank case. Thermostatic water control and vacuum oil control; built for higher speed than the Buda truck motor. All parts perfectly balanced to insure smooth running. Four and one-quarter inch bore by 5½-inch stroke. Will maintain speed of 1500 revolutions per minute without danger.

Transmission—Special coach transmission fitted with ground gears. Transmission placed amidship to allow for ease of removal. Four speeds forward and one reverse, direct in fourth.

Clutch—Oil type, multiple disc, fully enclosed.

Starting and Lighting—Leece-Neville. With this set is used a compensator which will take care of the difference in the

charging rate necessary between day time load and the night load. It is possible to charge at rate of five to six amperes to take care of the day load and when the load is on the coach body at night the generator will increase its charging to the rate of 15 amperes to take care of the proper coach lighting. This controlling is entirely automatic. Willard 12-volt storage battery, heavy duty, 180-ampere hours, is also supplied.

Frame—Special for coach work; wide track in the rear, fitted with kick-up over the rear axle to allow for low center of gravity. Wheelbase 196 inches for a body 19½ feet or longer; 184-inch wheelbase for 18½ feet body or shorter.

Axles—Rear, special coach axle, 71-inch tread to take care of side sway. Front, special drop giving eight inches clearance, 64 inches track.

Springs—Merrill electric Silico manganese steel made with auxiliary leaves to take care of overload. On the rear springs three auxiliary leaves are used which do not come into action until two-thirds of the load of the truck has been installed. This allows for easy riding when the coach body is partly loaded and the same ease when fully loaded. Rear springs are 3½ inches wide and 60 inches long, underslung and straight under full load. Front springs are 2½ inches wide and 44 inches long, straight under full load.

Brakes—Two heavy duty service brakes on the propeller shaft. These are five inches wide and 11 inches in diameter, operating through an equalizer which makes it possible to reduce the pressure per square inch on the lining, hence, giving longer life to same. These brake bands may be removed very easily when it becomes necessary to reline same. These brakes will stop the coach when fully loaded within 30 feet and will do this without any shock or jar to the chassis. Emergency brake on the rear axle operated through hand lever.

Radiator—G. & O. aluminum cast tank polished, with tubular core.

Universal Joints—Merchant & Evans griptie between clutch and transmission. Spicer joints between transmission and rear axle. A two-joint assembly is used between transmission and rear axle supported by an SKF bearing mounted in a center bearing housing.

Steering Gear—Ross, with special 20-inch hand wheel.

Outriggers—Chassis is fitted with outriggers top of which are flush with the top of the chassis frame. These outriggers allow the body to be placed directly on same, thereby keeping down the floor line of the body and supporting the body on its extreme width.

Gasoline Tank—Square type, 30 gallons capacity mounted under outriggers at the right hand side directly back of the front entrance door of the body. Gasoline is fed to carburetor by means of Stewart heavy duty vacuum tank.

Tools and Equipment—Lamps, Dietz heavy duty electric head and tail lights.

Each chassis is fitted with complete set of tools and jack, also Stewart electric signal, bumper and motometer.

Frame Heights—When the chassis is fully loaded the front end of the frame stands 24 inches from the ground and the rear end 26 inches from the ground, which will allow the floor line of the body at the entrance door to be held at least 26 inches from the ground.

Bronze Bushings—Fitted on wearing parts.

Wheels—Smith steel cushion.

Tires—Semi-pneumatic cushion rubber, 36 inches by five inches and 36 inches by eight inches or pneumatic if desired.

Dash—Pressed steel.

Carburetor—Zenith.

Magneto—Eisemann.

Oiling—Oil cups, wick system, on all springs and other wearing parts.

Shock Bumpers—Rubber shock bumpers are provided on both front and rear springs.

Wheel Bearings—Timken. Taper roller type.

Chassis Dimensions—25 feet over all; bumpers 12 inches additional; 80 inches wide over rear hub caps; frame 51 inches wide at rear, 35 inches in front.

UNIQUE MACHINES HELP BUILD MOTORS.

At the main plant of the Cadillac Motor Car Company in Detroit, in the department where the front axles are made, is to be found the Newton milling machine, the only one of its kind in operation. The "little giant" has a twin not doing active service in the hands of the manufacturers. "Newtie," as the machine is called by the Cadillac craftsmen, weighs in the vicinity of 15 tons.

Eight side cutters and two slab cutters are installed in the machine, which mills the spring pad and bearing ends of the Cadillac front axle at one operation.

The power is transferred to the cutters through a well planned system of gears, a 35-horsepower motor being required to furnish the power to turn the wheels.

Two other extraordinary machines are in use in the front axle department. These are called Baker drills and were adapted by Cadillac engineers from a standard drill. These machines drill the upper and lower spindle bearing holes of the Cadillac front axles.

Another novelty in the machinery line now in use in this department is the flexible power press that exerts a pressure varying from three pounds to 20 tons at the will of the operator.

Atterbury Announces Two New Trucks

Pioneer Manufacturer Completes Line with Finely Built Job Equipped with Latest Continental Engine

THE Atterbury Motor Car Company of Buffalo, old line manufacturer of motor trucks, is announcing two new models of 2½-3 and 3½-4 tons capacity. These two new models follow the 1½ and five-ton models which have been in production for some time.

The specifications give several important changes, all of which are standard equipment. Among these are found latest type K4 and L4 Continental motors with pressure feed lubrication and removable heads; Delco lighting equipment with generator; semi-enclosed all steel cabs with doors; built in glass windshields; left hand drive and center control; amidship transmissions, four speeds forward, one reverse; longer wheelbases; lower transmission gear ratios; new type hoods with removable side panels; polished aluminum radiators; combination radiator guards and bumpers; alemite chassis lubrication systems and vacuum gasoline feed systems.

These new models along with the 1½ and five-ton sizes which are already in production make the Atterbury line complete and thoroughly up to date. An examination of the improvements shows them to be refinements in design rather than radical and untried features intended for so-called "talking points."

In the motor truck industry the Atterbury Motor Car Company has the distinction of being one of the pioneers. Ever since the company was founded in 1903 they have specialized on motor trucks exclusively and throughout the trade they have always been recognized as one of the strong and permanent factories.

During its 19 years of history Atterbury has always been dedicated to quality and dealers have consistently reflected the satisfaction of owners by permanent, increasing business.

The newest price list of Atterbury

motor truck chassis is as follows:

20R 1½-ton chassis with open cab..	\$2475
22C 2½-ton chassis, standard wheelbase with semi-enclosed cab....	3375
22C 2½-ton chassis, long wheelbase with semi-enclosed cab.....	3475
22D 3½-ton chassis, standard wheelbase with semi-enclosed cab.....	4275
22D 3½-ton chassis, long or special short wheelbase with semi-enclosed cab	4375
8E five-ton chassis, standard wheelbase with open cab.....	4975
8E five-ton chassis, long wheelbase with open cab	5125

All prices f. o. b. Buffalo, N. Y., U. S. A.

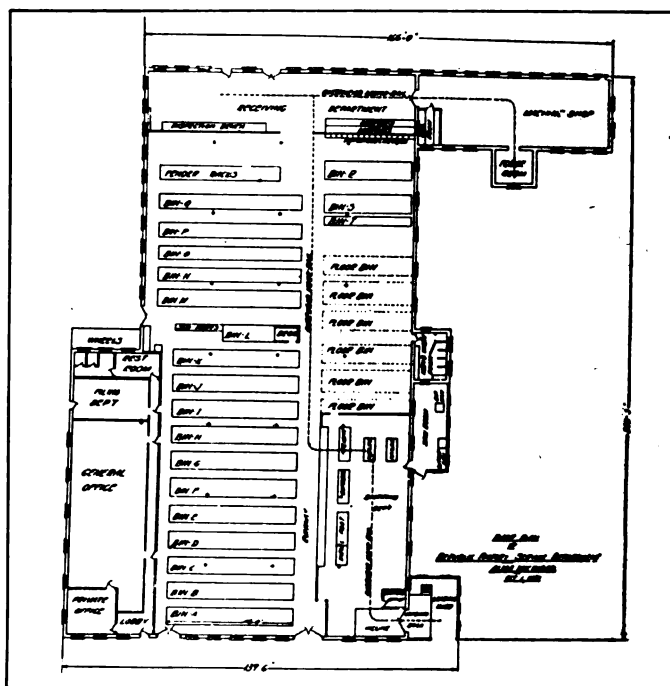
Prices subject to change without notice.

Above prices do not include U. S. government tax, which must be paid by purchaser.

FORD'S ROAD SHOWS LOSS.

The August, 1922, report of the Detroit, Toledo & Ironton Railroad, Henry Ford's road, shows a net operating deficit of \$300,404 as compared with a net income of \$109,574 for the same month of 1921. Gross earnings in August were \$719,708 as compared with \$802,771 in August, 1921. For the first eight months of the year net operating income was \$388,747, compared with \$444,208 of 1921.

A Modern Truck Service Department



The service department of the Republic Motor Truck Company, Alma, Mich., illustrates in a decided manner just how well systematized and properly laid out all departments of this truck company are. There is a place for everything and everything is in its place in this modern establishment. The building has been designed and constructed in such a way that both work and time are saved in servicing the company's trucks.

In the front and to one side is placed the private office of the manager, while in the rear of this is the general office. In back of the general office the filing department is placed. In order to allow access to this department without passing through the main office a side door is provided. After the filing department is the rest room, which is made accessible to employees without passing through other departments, by a long passageway.

On the opposite side is the loading dock and shed, the shipping room, the wood working shop and the men's wash room. At the rear is placed the machine shop, the blacksmith shop and the receiving department. The center of the building is laid out in bays alphabetically arranged, in which the various parts of the machine are placed. Doors are provided which allow easy access to the supplies from all other departments. Another interesting feature of this establishment is an overhead mono-rail carrier, which passes from the loading dock, through the shipping department, into the spare supply room, to the receiving department and the machine and blacksmithing shop. This carrier makes the moving of any loads from one department to another a comparatively simple matter and also saves much time and energy.

Truck Reduces Sewer Cleaning Cost

IN THE city of Perth Amboy, N. J., according to the street commissioner, it costs on an average, \$6.96 per basin to clean sewers by the usual method of hand labor and teams. But P. J. Healey of New York City has designed a machine which in the same city does the work for \$3 per basin.

The machine consists of a Unit 50 Selden truck upon which is mounted an especially designed dumping body which may be removed, allowing the truck to be used for other purposes. Upon the truck platform is a mast and boom, the mast resting upon ball bearings so that the boom may be swung directly over the catch basin.

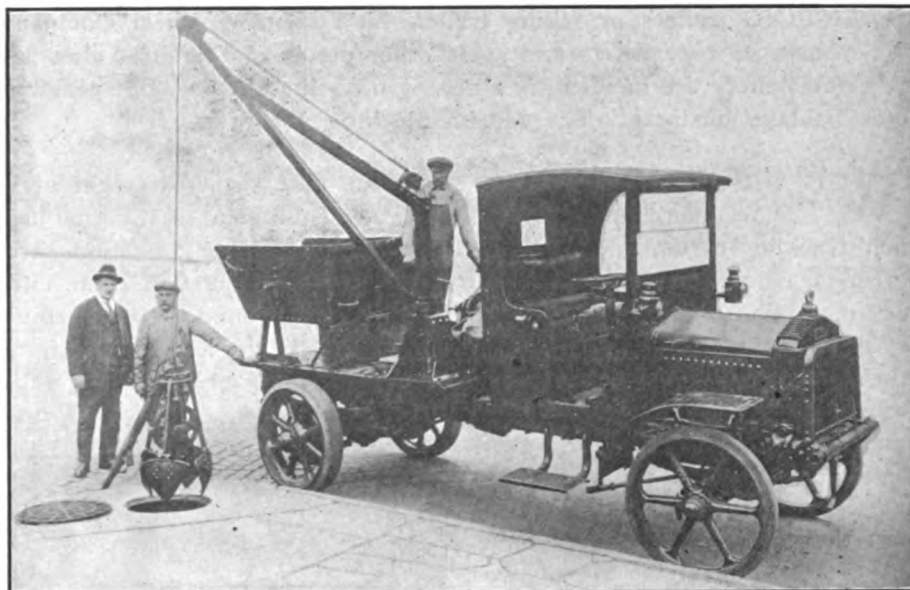
A grab bucket, operated by power driven drums using two cables, one for hoisting and lowering the bucket and the other for opening and closing it is carried by the boom. The power is taken from the truck motor. A pole is used to direct the bucket, making it possible to clean the entire circumference of the catch basin without sending a man below the surface.

The dump body on the device can be used as a container and may be dumped directly into another truck, so that while the second truck is taking its load to the dumping point or scow the container on the machine can be reloaded, ready to be discharged into the empty truck upon its return.

The operation of the truck in conjunction with the cleaner prevents loss of time. The cleaning machine may be continually operated, proceeding from one catch basin or sump to another, or to any place from which it is desirable to remove deposits, and without the loss of time which would be experienced were the machine itself sent to the dump.

The grab bucket, which is of the orange peel type, has a large capacity, making the operation of the machine very rapid.

A series of tests made by A. F. Munoz, street commissioner of



But 20 to 30 Minutes Is Required to Clean a Catch Basin with This Equipment.

Perth Amboy, demonstrated that catch basins can be thoroughly cleaned in 20 to 30 minutes with this truck and two men. As stated before the cost is reduced over 50 per cent., in other words, cut in half.

Mr. Healey's machine has received the hearty approval of all municipal authorities who have seen it in operation. Easy to handle, thoroughly efficient and reliable, the machine will soon pay for itself in the saving effected. A Unit 50 Selden has proven very successful in connection with the apparatus which is operated by the truck motor.

Salesmen Travel in Special Truck

A UNIQUE sales programme has been put in use by Richard Drake, truck sales manager of the Chaddick Automobile Company, Oldsmobile distributors in San Antonio, Tex.

Mr. Drake declares that the character of the country is such that it has often been found that a salesman would take an Oldsmobile truck many miles out into the country to interview a prospect. It has been found, he says, that the sale could not always be completed in a single day and it was impossible for rancher to ask him to stay there.

to have dinner with his family or spend the night there.

With this end in view, Mr. Drake has fitted an Economy truck with side curtains, two three-fourths width beds, mattresses and bedding, which fold up when not in use during the day. A duofold is also used as seat for day travelling and can be used as another bed at night, so that six people in all can be accommodated.

A four-burner kerosene cooking range, with an oven, a large ice box, a folding table, several camp chairs with arms are all part of the equipment.

In addition to this, a two-foot width space in the top of the covering has a six-foot floor clearance, so that the occupants can walk from one end to the other without stooping. On either side of this clearance space are two compartments, running the full length of the body, where a complete line of cooking utensils, dishes and linen is carried.

In addition to the use of this truck by the salesmen of the company for the purpose of camping right on the ground of a prospective customer, Mr. Drake intends to have the salesmen invite the rancher, his wife and children and friends, if he cares to, into San Antonio for a visit and the party will use the truck to camp in Breckenridge Park for several days.

Martin Company to Rent Trailers

RENTING trailers or selling trailers on a rental basis, as typewriters and some other pieces of machinery are handled, is a new wrinkle in the motor haulage business. The Martin Rocking Fifth

Wheel Company of Springfield, Mass., has just announced that it is going to follow this plan.

In speaking of this new departure Mr. Martin says:

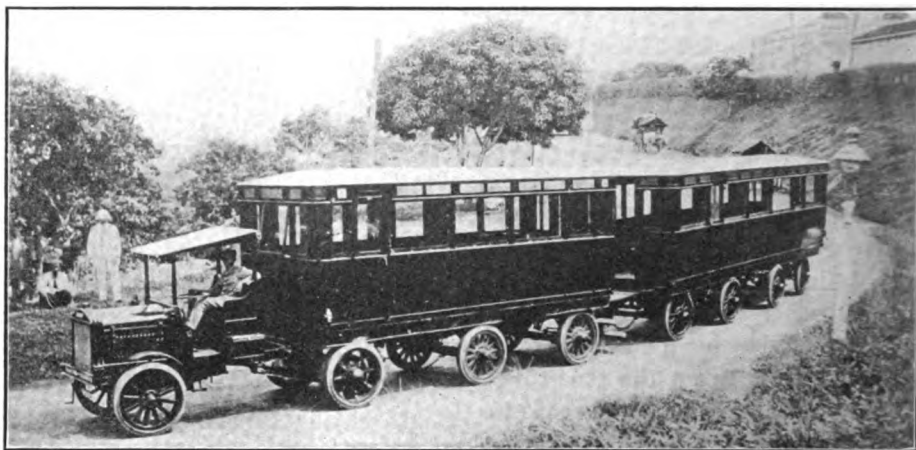
“WE FIND that there are many merchants having much trucking to do, such as the lumber dealer, the contractor, the truck man, who realize in a general way that the trailer would materially reduce their hauling costs, yet for various reasons hesitate to adopt them. We decided by taking this step and assuming all risk ourselves that we could conclusively demonstrate that the trailer is a big money saver—yet, by receiving rental, we would be paid for the demonstration. The very small charge that we make—\$1 per day per ton capacity—will pay us and also pay a handsome return to the renter. For instance, a trucking company running between Springfield and New York, getting a dollar a hundred and making two round trips a week, has an earning capacity with a five-ton trailer (which he can easily pull in addition to his regular load) of \$400 a week and our rental charge is only \$35.

“While the economies of the trailer system have been known for some years, general conditions have been

such the past two years that very little new equipment of any kind has been sold, but the indications are now that the trailer will come into its own. Every motor truck manufacturer is making and listing short wheelbase trucks to be used as tractors. The General Motors Truck

in the country is being used for hauling trailers.

“Great Britain is ahead of us in the use of the tractor-trailer principle. The officials there are advocating it as the most effective means of curbing the constant ruthless wear and tear of the highways. Just as

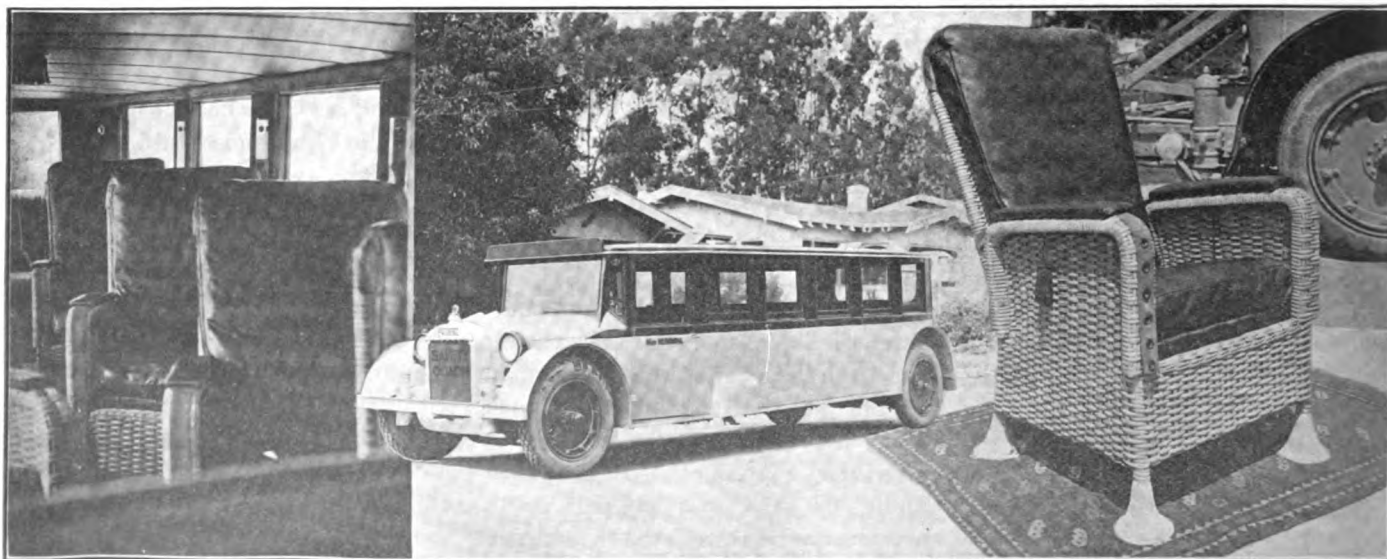


Rocking Fifth Wheel Manufacturer, Believing There Is Well Authenticated Demand for Trailers on Part of Vehicle Operators, Will Rent Units.

Company have just announced a line of tractors, from five to 15 tons capacity. The Pierce-Arrow company makes a specially geared truck for a tractor; in fact, every make of truck

large loads can be carried when the weight is distributed over a number of axles as when it is all put on one axle, a fact which makes feasible the use of the trailer.

Fageol “Safety Coach” Finely Appointed



Constructed Along Lines That Not Only Make It Exceedingly Safe but Also Impart a Distinctly Sporting Look, This Fageol Safety Coach, One of Many That the Company Has Manufactured, Makes an Unusual Appeal to the Passenger.

Farm Machinery Is Low in Price

The Manufacturers' Show and Advertising Bulletin Put Out by the National Institute of Progressive Farming, Says That State Fair and Exposition Exhibitors Have a Wonderful Opportunity to Get Over Lesson to Live Stock Farmers That Farm Machinery Is Cheap in Live Stock Products.

"THE state fairs are crowding up for attention," states the bulletin, "and every manufacturer has probably settled on the fairs and expositions at which he will exhibit. These shows are great expositions where some 20,000,000 people gather, especially farmers, at a time of year when they are not reading their farm papers and when manufacturers are not advertising through those papers for that very reason, as well as seasonal objections.

"The farmer has got out of the buying habit through lack of capital and propaganda on buying second hand farm equipment at sales and repairing worn-out machinery.

"HWILL look at the 'usual' show of farm machinery in the usual way. Let's put on an unusual show that will not only jolt him out of his lethargy and start a year-round buying of all modern farm machinery, but make our exhibits the outstanding feature of the state fairs and national live stock expositions this fall. The Opportunity Is Here—Especially in Hogs, Sheep and Dairy Products.

"Not only has the farm tractor been cut in half as to price since 1913 (pre-war), but hogs are nearly 50 per cent. higher than then, and fat lambs are more than double. Where we could talk the cash difference to the farmer on a tractor to start him to buy, and show a 50 per cent. advantage in price, not to mention a better power plant, we can translate it into hogs and show 150 per cent. advantage, or into sheep and show more than 200 per cent. in favor of buying a tractor now.

"Look at the sketch we have had our artist draw up and then plan your fair exhibits, your posters and dealer window displays, and your advertising accordingly. All together on this idea and we can start a buying drive, and by the best class of progressive farmers in the nation.

"Here's the official price figures, the year book of the Daily Drovers' Journal, Chicago, being used for the 1913 live stock prices:

	(July 31) 1913	1922	No. head to buy a tractor
Hogs	\$8.35	10.75 top	80 34
Fat lambs	7.70	*12.90 ave.	260 64
Fat steers	8.25	10.60 ave.	20 8

*American sheep breeders' figures for July at Chicago.

"Put a radio on your tractor at the shows and receive the daily markets, chalking them up on the blackboard in front of your exhibit, and readjusting the balance your farmer can bank from his hogs or sheep after he buys your machinery.

"Stick that old 1913 model tractor over at one side of your pen of hogs or sheep. On the other side of the live stock exhibit put your brand new 1922 model and to it hitch all the other things you can buy with the same hogs or sheep that it took to buy that 1913 experimental tractor that was so big and heavy and complicated that few farmers could af-

GUY H. HALL.



A Short Time Ago Hardly Anyone in the Agricultural Implement Industry Knew Mr. Hall. Today Through His Unusual Success as Director of the National Institute of Progressive Farming He Is Known to Thousands. The Industry Is to Be Congratulated in Obtaining the Valuable Services of This Man Who Has so Materially Advanced the Cause of Agriculture Throughout the United States.

ford it, or could run it after they had it. Be Sure to Get in the Appeals to the Live Stock Man with Pure Breeds.

"In these exhibits allow for a pure-bred bull, boar or ram, or all three. Use liberal prices, too; for while you can buy pure bred bulls for \$100, the \$200 ones are better, and you will please your live stock breeder by giving him a chance for profit. Use the U. S. government statement that pure bred sires will increase the value of the crop from common scrub stock 42 per cent. just as a commercial proposition. Have signs, charts or placards bringing out these points.

Get the Farm Woman "Sold" on the Tractor by Including Something for Her.

"In every combination trailer your 1922 model tractor, regardless of how many disc harrows, wagons, seeders, potato planters, etc., you may want to work in, be sure to put some improvement inside the house to show the women the tractor

is "pulling for them." A farm home power plant that will give her running water, light and power for a washing machine, ironer and vacuum cleaner can be put in for \$430. Washing machine, ironer and vacuum cleaner can be added for \$350, or perhaps a little less. Rig up a float and put in such a hookup. Go a step further and have some club girls working with these outfits.

Get Right with the Banker, Too.

"Be sure to show him that the farmer can bank some money after buying all these improved machines with the same number of hogs or sheep it took to buy a tractor back in 1913.

"Don't think you are left out of the picture if you weren't making a tractor back in 1913. Compare your 1922 one with those few big, clumsy, costly ones that were out. Use \$2000 as the sum it cost if you like. Few manufacturers "got" the idea when we bulletined you for this information some time ago. Hence we are using the U. S. House of Representatives' report of joint commission of agricultural inquiry figures on implements in the hasty bulletin we have sketched here. Take your own machinery and figure accordingly. What we want to get to you is the idea and then get action from you that will start something in the buying line with the best class of buyers in the world: The American live stock farmers.

"If you can't afford a big live stock exhibit like these, use only a pen of three or four hogs or sheep with big signs telling the story. If you can't even make a fair exhibit, you can copy the ideas in your advertising and you can get it to your dealers throughout the country.

"Where several manufacturers are showing on the same fair grounds, the different live stock should be used by different exhibitors. At the National Swine Show and at the Dairy Show, special appeals both in live stock and in machinery should be made to get greatest benefits.

Make These Exhibits Live.

"Hook up and pull the machinery around by tractor power past the swine and cattle barns once or twice a day with signs on everything to tell the story. Get these exhibits into the live stock parades before the grandstands, and at the night shows in the show buildings."

Italy's Implement Industry

AN ITALIAN representative of an American manufacturer states that Italian threshers operate efficiently enough, although perhaps they may be criticised on the ground that they usually require more men to tend them than do American threshers. This, however, is not a serious drawback in a country where agricultural labor is fairly abundant and relatively cheap.

The lighter farming appliances, such as plows, harrows and cultivators, are extensively manufactured. One company particularly, the Fabbrica Italiana Macchine Agricole of Alessandria, with a capital of 1,200,000 lire, has a large output of the articles named above and also of wine presses and other equipment for vineyards. This company, however, does not attempt to make the heavier and more complicated machines.

The readiest explanation for the restricted extent of the industry in Italy can be found in the keen competition of imported machinery. The unfavorable levels of dollar-lira exchange that have prevailed for several years, as well as the high duties on agricultural machines imposed by the tariff of July, 1921, have reduced imports from the United States to comparatively small figures during the past year; but under more favorable conditions American machinery can readily occupy its former prominence in the Italian market. In any case, potential competition from the United States al-

ways confronts the Italian manufacturer.

German exporters of farm machinery to Italy are, of course, aided tremendously by the heavy depreciation of the mark in terms of the lira. The duties made effective by the tariff of July, 1921, do not seem to have cut down imports from Germany, which sends to Italy large numbers of mowers, threshers (despite the large number manufactured by the Italians themselves), and plows.

Increased Activity During War—Duty on Motor Vehicles.

During the war the withdrawal of many agricultural laborers for military service and the urgent need for the largest possible production of staple grains powerfully stimulated the Italian industry. Many machine shops and even foundries took up the production of agricultural machinery. This war time activity of the industry was short lived, however.

A number of automobile manufacturers and general mechanical companies, including Fiat, Ansaldo and Romeo, went into the production of tractors toward the latter part of the war, but the Fiat is practically the only company that remains in this branch of production. Development of the tractor industry has been hindered by the fact that the government was left with a large stock of tractors on its hands at the close of the war, the subsequent disposal of this surplus having interfered with the market for the machines since made or import-

ed. Furthermore, enough foreign tractors have come in to meet a large part of the demand and to narrow the market for the Italian machine, which is not very extensive in any case.

The sale of imported tractors in Italy is seriously affected by the provisions of the tariff on motor vehicles imposed Sept. 16, 1920, and continued in force by the new general tariff of July 1, 1921. In addition to a graduated specific duty on the weight of the individual self-propelled machine, an ad valorem super-duty of 35 per cent. is levied. It is definitely stated that the additional 35 per cent. applies to automobiles, while the specific duties are assigned to all classes of automotive vehicles, but the customs administration has extended it to apply to tractors also, so that their importation has become practically a commercial impossibility.

Italy's exports of agricultural machinery have always been smaller, in fact, so small that official statistics do not name individual countries of destination. The total exports for the nine months July, 1921, to March, 1922, were as follows: Plows, 68 metric tons, valued at 458,700 lire; harrows and cultivators, seven tons, value 62,200 lire; threshers, 26 tons, value 168,180 lire; and all other, 221 tons, value 1,513,822 lire; a total of 322 metric tons, valued at 2,202,902 lire. (The lira, which is worth \$0.193 at par, was quoted at \$0.0436 recently.

STATEMENT OF THE OWNERSHIP, MANAGEMENT, CIRCULATION, ETC., REQUIRED BY THE ACT OF CONGRESS OF AUG 24, 1912, OF

MOTOR TRUCK,
PUBLISHED MONTHLY AT PAWTUCKET, R. I.
For October 1, 1922.

State of Rhode Island, County of Providence.

Before me, a Notary Public, in and for the state and county aforesaid, personally appeared William H. Black, who, having been duly sworn according to law, deposes and says that he is one of the owners of the MOTOR TRUCK and that the following is to the best of his knowledge and belief, a true statement of the ownership, management, etc., of the aforesaid publication for the date shown in the above caption, required by the act of Aug. 24, 1912, embodied in section 448, Postal Laws and Regulations, printed on the reverse of this form, to wit:

1. That the names and addresses of the publisher, editor, managing editor and business manager are:

PUBLISHER, WM. H. & D. O. BLACK.....Providence, R. I.
EDITOR, S. G. SWIFT.....East Providence, R. I.
MANAGING EDITOR, S. G. SWIFT.....East Providence, R. I.
BUSINESS MANAGER, WM. H. BLACK.....Providence, R. I.

2. That the owners are:

WM. H. BLACK.....Providence, R. I.
D. O. BLACK.....Providence, R. I.

3. That the known bondholders, mortgagees and other security holders owning or holding one per cent. or more of total amount of bonds, mortgages or other securities are:

M. J. BLACK, Mortgagee.....Providence, R. I.

4. That the two paragraphs next above, giving the names of the owners, stockholders and security holders, if any, contain not only the list of stockholders and security holders as they appear upon the books of the company, but also, in cases where the stockholders or security holder appears upon the books of the company as trustee or in any other fiduciary relation, the name of the person or corporation for whom such trustee is acting, is given; also that the said two paragraphs contain statements embracing affiant's full knowledge and belief as to the circumstances and conditions under which stockholders and security holders who do not appear upon the books of the company as trustees, hold stock and securities in a capacity other than that of a bona fide owner; and this affiant has no reason to believe that any other person, association or corporation has any interest direct or indirect in the said stock, bonds or other securities than as so stated by him.

(Signed) WILLIAM H. BLACK, Co-Partner.

Sworn to and subscribed before me this 17th day of October, 1922.

(Signed) THOMAS RESWICK, Notary Public.
[Seal] (My commission expires June 30, 1923.)

SALES MANAGER MOTOR TRUCKS

An opportunity is offered to secure the services of a high class Sales Manager, whose experience in the New York City field extends over a period of ten years. This man has been unusually successful, and is qualified to take entire charge of Sales, retail and wholesale, Service and Shop. He will not consider leaving the New York field. Write only to H. C. F., Room 308, 135 Broadway, New York, N. Y.

TRACTOR WORLD

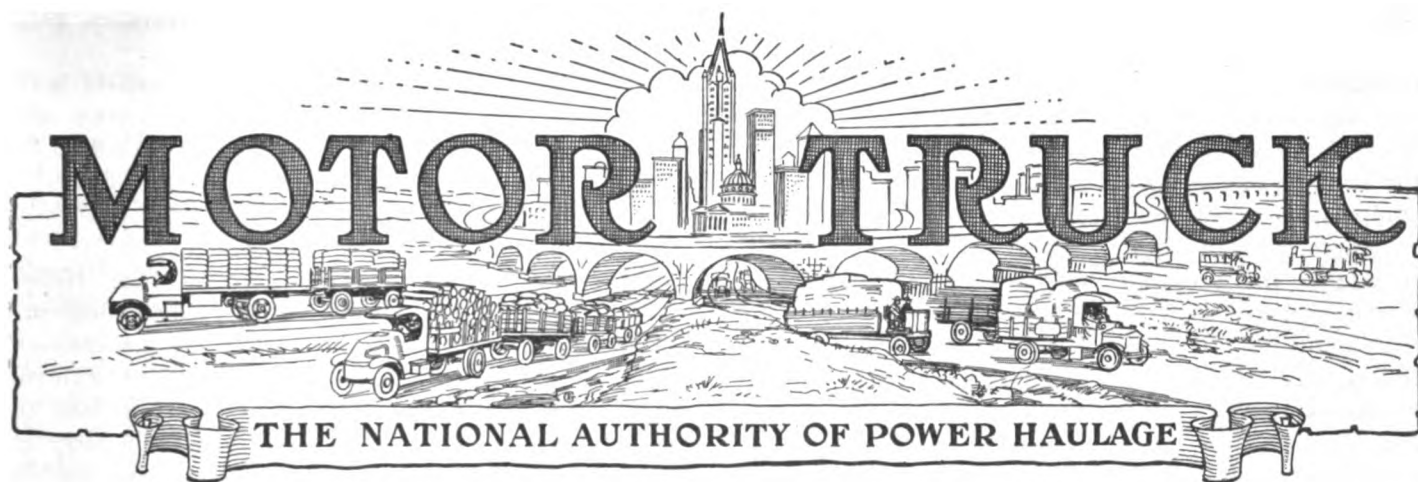
Monthly 20c the Copy \$2 the Year

A Tractor Journal devoted to the tractor industry and trade

Published by

The Automobile Journal Publishing Company

PAWTUCKET, RHODE ISLAND



VOL. XIII. NO. 11.

PAWTUCKET, R. I.

NOVEMBER, 1922.

Motor Truck Prices to Be Higher Say Manufacturers

Mounting Cost of Parts and Labor Combines With
General Unsettled Business Conditions to Cause
Advance in Price of Commercial Vehicles.

(By S. G. SWIFT.)

MOTOR truck prices, for more than a year unreasonably low in comparison with other commodities, are due for an advance within the next few weeks. To some this must come as news.

Others are aware of the facts in the case and to them the announcement of higher prices will cause no surprise.

For some few months, since parts production costs began to mount, it has been rumored in the inner trade circles that motor truck manufacturers could not continue to absorb the increased cost which was of necessity passed on to them by the parts makers.

These rumors now have crystalized into statements made to representatives of this magazine by several of the better known truck manufacturers, who say that it is their intention to increase prices within two months. Others also are reported to be planning to follow suit as soon as they have disposed of the vehicles now on hand.

THIS writer knows intimately the manufacturer of a dependable and justly popular make of truck that will be raised in price next month. Already plans are made and those readers of this book who follow

closely the general developments in the motor truck field will see the announcement of the change in an issue of this trade paper.

Another well known truck is also to sell at a higher figure. The build-

BUY MOTOR TRUCKS NOW—PRICES ARE GOING UP.

TODAY, while you are reading these lines, is the best time to buy trucks! Right now! This statement is carefully weighed and may be taken as authentic.

In view of the somewhat general tendency of motor vehicle prices to go lower during the last 13 months there has been a good excuse for the prospective motor truck purchaser to hold off buying in the belief that prices eventually would hit a lower level; it is logical to withhold buying on a falling market—just as it is entirely logical to purchase when the bottom has been reached which in the case of the motor truck is right now!

From now on motor trucks are going to be higher in price; a prophecy founded on actual fact as will be proven by the developments of the next few weeks. See if it isn't!

in the price of our product. This step is due entirely to rising production costs."

"If the truck buyer would put himself in our position in the present crisis he would understand just why we are going to be obliged

er of this vehicle said in a recent letter received by the writer: "As soon as our present stock of trucks is marketed, which should be about Jan. 15, we shall be compelled to announce a fairly substantial increase

to raise the price of our product in about six weeks," said another manufacturer with whom the writer talked. "As a matter of fact we aren't raising the price, the parts' manufacturer is raising it for us—

in justice to whom it should be said, that they aren't responsible for the raise in any way, but are victims of the same force of circumstances that compels us to raise our prices.

"There are many factors that contribute to the situation, no one of which perhaps is more responsible than another. It seems as though the increased wages paid in certain trades has combined with the great car shortage, the scarcity of coal and the various troubles directly traceable to the railroad and miners' strike, to make it necessary for the parts makers to raise the price of their products and thus we have to follow suit; it's simply another example of the old law of cause and effect with the car manufacturer on the receiving end of things."

"We can't say just when we shall raise our prices," said a middle western manufacturer. "Not until we actually have to; when our present parts stock is exhausted, which in all probability will be about the first of January. Then we shall raise—it won't be a question of whether we want to or not; it's either that or use a lower quality of parts which is something we shall never do under any circumstances."

MOTOR TRUCK OUTPUT 27% ABOVE LAST YEAR.

REPORTS of the U. S. Department of Commerce report that motor truck production in September, 1922, was 27% above September, 1921, though showing an expected decline from summer business. The output for September this year was 18,843, for August this year 24,200 and for September, 1921, 13,648.

The average reader—despite the foregoing—unless thoroughly conversant with the subject, may feel that an advance in motor truck prices at this time is unwarranted. The opposite, however, is the fact. Motor truck prices ever since the war have been low. They have held at an artificial level dictated in part by the sale of reimported trucks, the

TRUCK PRICE RAISE IS NECESSARY.

IT IS unfortunate that commercial vehicle prices should be raised at this time when business is just starting to show a return to its former healthy state and still more to be deplored that the rise should come at the beginning of the winter season which at best is not too easily got through with by the majority of truck dealers.

There is no other way out of it, however—it's either a case of raise the price or lower the quality—and this latter is not to be thought of for a moment. Truck manufacturers have expended too much thought and money in perfecting their products to be willing to lower one bit the high standards of construction now prevailing and no one would care to see them do it. Least of all the progressive dealer.

postponing of construction contracts, the surplus vehicles left over from the war and general bad business consequent on the poor industrial health of the entire country.

This alone has tended to keep prices lower than they should be, but even so, with the business sky again showing signs of clearing and prospects for fair profits on motor truck sales looking better than they have for months, it is doubtful if the truck manufacturers would have raised these prices had such a raise not been made necessary by the increasing cost of everything that goes into the truck.

Advance in Price Not Made with Idea of Gaining Extra Profits.

This advance is not made with the idea of making extra profits. It's made simply that a fair proportion of profit may be obtained and as a means of keeping factories running on a proper basis. Even the increased prices at which the truck is to be sold actually will give the manufacturers a smaller percentage of profit than is usually thought necessary.

We are in thorough accord with the manufacturer quoted who said that the parts makers are not to be censured for raising their prices.

They aren't. It was the only thing they could do.

Automotive Industry Has Never Faced More Unsettled Conditions.

It's probable that the automotive industry—which grew, in a little over two decades, from nothing to the leading "fabricated" industry in the United States never faced a more unsettled condition than it does today. There is no stability to raw material markets, labor is advancing with everything else, the nation has never experienced such a serious car shortage in its history—coal is scarce and the strikes throughout the country have effected nearly all lines of manufacture.

As a result there has been no chance for either the parts manufacturer or the motor truck builder to estimate production costs with any degree of accuracy simply because of this fluctuation which made it impossible to say what the selling price of the finished product should be.

The logical thing for the manufacturer to have done in the light of

138,000 CARS AND TRUCKS ON PENN. FARMS.

FARMERS of Pennsylvania own 138,000 cars and trucks, according to a survey of the Department of Agriculture of that state. This is an increase of 61 per cent. since the U. S. Department of Agriculture census in 1919. The motor truck total is now 17,000 or nearly double the farm truck registration of Pennsylvania in 1919.

this constant change of price (which has not held steadily in any direction) would have been to set his prices high enough to cover him against any rise and to purchase as small a supply of materials as possible to get along with in a "hand to mouth" manner. But he could hardly do this. In regard to price, the competition of wartime trucks,

surplus parts, strikes, general poor business and the like has so long depressed business that the manufacturer, anxious to get started again after the post war depression has chosen to sell his product at as low a price as he dared and many times this price has been too low as the number of failures and near failures has attested. In the matter of purchasing material the manufacturer was forced to gamble; he has had little say in the matter; it has been a case of taking what he could get when he could get it, due to the car shortage which caused even the most conservative manufacturer to buy in excess of what caution dictated to be a safe amount; this because he felt that it was policy to take what he could get when it was available for the reason that he did not know when he would be able to purchase more goods.

Truck Prices Have Been Lowered While Materials Have Been Raised in Price.

Here's another phase of the matter. It is well-nigh impossible to get a comparison of average raw material prices for the last few years, but we know that these prices are more than 60 per cent. higher right now than they were in 1915. We also know that coal, fuel, oil, steel, iron, coke and steam coal, despite the settlement of the rail and mine strikes, are appreciably higher today than they were a year ago, this because of accumulated orders, shortage of cars and other influences that may be traced directly to the strikes. Consider this and then note that despite these facts truck prices have dropped steadily for 13 months and it will be seen that there has been a decidedly unbalanced price relation—the price of the finished product has been going down while everything that went into its manufacture has been going up—surely an unbusinesslike condition and one that could not in reason obtain for long.

Motor Truck Sold at Close Margin of Profit to Manufacturers.

There are a few products—jewelry, sporting goods and certain other lines that, because of the large profit

Flimsy Highways Waste of Money

ONE fundamental fact which stands out in all serious consideration of the great question of road building and road maintenance in the United States is that the country cannot stand still. There must be enduring progress, or there will be loss of ground already gained, according to L. G. Fairbank, general sales manager of the Firestone Tire & Rubber Company.

For the people will not endure the burden of paying for the construction of costly highways, only to see them go to pieces in a year or two. The waste is intolerable, the cost too heavy to be borne. The improved roads must last longer, or they will not be kept up at all.

To put the problem that way is to show that road building must be better done and road maintenance must be more careful and more intelligent. America cannot sink back into the mire of highways which had "no bottom in the winter and no top in the summer." That period is past. We must go ahead, as a people, in the construction, use and enjoyment of good roads. Public sentiment decrees the progress which economic needs demand.

The movement toward heavier and larger vehicles, on improved roads, is in harmony with the progress of the age. It marches with the times. Similar changes are steadily going on in transportation by sea and on inland waterways. They have been marking and hastening the development of American railroads. They characterized the growth of interurban trolley lines until they ran into the hard and almost paralyzing conditions which were partly the result of the war and partly the fruit of unsound early financing and inadequate construction and equipment from the beginning.

Everything points to increasingly powerful and capacious motor vehicles of various kinds, used in greater and still greater numbers, and such transportation will depend upon and necessitate roads solid enough and scientifically sound enough to bear the strain to which such traffic will subject them. The larger units will drive the smaller before them on the public roads as they have done the same thing on the steam railways, the trolley lines, the rivers, the seas and even the canals.

Since all this is clearly foreshadowed and is plainly near at hand, the only escape from ruinous expense, in struggling with the road problems of a country which labors under serious climatic difficulties, in its sections of greatest population and heaviest traffic, is to prepare as rapidly as possible for the coming era of wonderful motor truck transportation by building roads which can "stand up" under the loads they must carry, and do it year after year, for long periods.

That is to say, the road building of this rich and progressive but sometimes wasteful and careless nation will have to be done with more scientific pains and greater efficiency.

The importance of this problem of government and economics is not yet fully understood, but it is growing clearer, day by day, as the use and enjoyment of good roads, even good in the superficial and painfully temporary sense, makes converts and wins the favor of the public that pays the bills.

We must get more years, even though we have to accept less miles for our millions poured out in the building of highways. We must move more slowly, but with fewer mistakes. It is imperative that greater value shall be obtained in building roads, or the widest, most comprehensive, most elemental and basic part of our transportation system can never attain its proper development.

at which they are merchandised, can stand such fluctuation for a time without changing the selling price of the article. Not so with the motor truck which is produced and sold at such a close margin of profit that any wide divergency in the price of the units of which it is made must have an immediate effect on the retail price of the vehicle.

So much for the facts that explain why motor truck prices are due for a raise just as they show the advisability of quick action on the part of the prospective purchaser.

There are many sales of motor trucks which have been delayed due to a belief in eventual lower prices,

this despite the very obvious fact that prices in about every other line have shown an appreciation. In view of the somewhat general tendency of motor vehicle prices to go lower during the last 13 months, there has been a good excuse for the prospective purchaser of a motor truck to hold off buying in the belief that prices eventually would hit a lower level; it is logical to withhold buying on a falling market—**JUST AS IT IS ENTIRELY LOGICAL TO PURCHASE WHEN THE BOTTOM HAS BEEN REACHED, WHICH IN THE CASE OF THE MOTOR TRUCK IS RIGHT NOW.**

POINTERS ON SERVICE

(Extracts from a Business Talk to Students of the Michigan State Auto School.)

THE best advertising for a garage business is turning out accurate work, carefully inspected before it leaves the shop; courtesy to customers, and neat appearance of the building, inside and out, and its surroundings.

Don't get so busy running things inside of the shop that you neglect the outside and lose business by it.

If you have a garage or a gas station on an unpaved road, you should cement the space in front of your shop so that a car can drive up and the people get out without getting in the mud.

Have your garage painted fresh every year and an attractive sign on building just as large as there is room for.

HAVE the inside of the shop painted black on the wall up to about three feet from the floor and clear white for the rest of the wall and the ceiling. This gives more light and a good appearance, and makes it look up-to-date and progressive.

One of the best ways of advertising is to give every customer whose repair job runs over \$15 a free car wash. The effect will be greater than you have any idea of. On every job that goes out, no matter how small, see that the inside of the car is brushed out and the steering gear, dash, instruments and windshield wiped clean, whether they were that way when the car came in or not.

Have canvas covers to put over the fenders to keep them from being scratched. Never sit in a car with overalls unless you cover the seats and if you have to go inside of the car it is a good thing to take out the carpet. These are little things and don't take much time, but will back up your reputation in a way that will surprise you.

If you have an office, keep it neat. Don't have any litter on the desk or shelves or floor. Keep the windows washed. See how fast clean windows will put you ahead of your competitors.

You should work out as soon as you can a flat price list of service charges. Almost all of the big service stations throughout the country are using this system, and big or little, it is a step in advance that must be taken by all garages and service shops. Charges vary in different sections of the country. A customer should be able to buy service like he buys a hat—pay a definite price for it and be satisfied

that he is getting what he is paying for. This will avoid arguments and satisfy the customer. We can help you line up your schedule of charges.

In buying parts for your customers' cars, always buy the original manufacturer's parts. Never buy what are called "pirate parts"—that is, inferior parts made for a car by some other concern. You may think you are putting something over when you do this, but you will only be putting it over on yourself.

If you have a gas station, have a few good accessories for sale, too. Do not carry a large stock of any-

NEW HIGHWAY OPENED. MOTORISTS "STUCK ON IT."

MORE than 5000 automobile parties who drove into a new section of road near Lector, Va., to take part in a celebration of its opening were stuck fast in the mud all night.

While the celebration was at its height and Governor Trinkle was delivering an address on the benefits to be derived from the new highway, a heavy rain began to fall. There was an immediate exodus of automobiles, but few of them got very far before they mired to the axles, jamming the roadway and shutting off the retreat of those behind.

Many of the celebrators spent the night in their stalled cars and reported when a fleet of tractors came to their rescue that the women and children had suffered considerably from exposure to the cold and rain.

thing, even though you may get a greater discount by doing it. It is better to have a small stock and turn it over often than to have a lot of dead supplies on your hands. It is well to keep in touch with a reliable equipment house and advise with them on your accessory needs and selling methods, but don't let them overstock you.

Keep account of your business. That is, have a bookkeeping system. This is absolutely essential and no business can succeed without it. It is required for the government reports anyway. Get as simple a system as you can. If your business is small a system all in one book will do and when the business outgrows the system you can get a bigger system, but don't get it before you need it.

Have a card system on repair jobs and never take in any job without writing it up. The customer should have a claim check and you should have a carbon copy of the order in your office file in addition to the card on the job. Write down on the card whatever you use on the job so that you will be sure to overlook nothing when making up the bill. The system used in our school garage is very complete and may be copied by any students who wish it.

In every car or job of any kind that goes out, you should stick a card saying, "If you like this job tell your friends," and include a description of all the work that you are able to handle. If there is a newspaper you should use it regularly. Your ad would not need to be large, but should be in all the time. Have a printed letter head and envelopes and bill heads.—N. A. C. C. Service Bulletin.

How Good Roads Have Pushed a Florida County to the Front

Polk County Now Able to Market Its Fruit with Dispatch
and Economy—New Highways Develop
Great Industry.

SO GREATLY, in recent years, has the good roads movement developed that good roads are now the rule rather than the exception. They have come to be a national habit, and your motorist is apt to feel a bit insulted if he strikes bad going anywhere on his trips between extremes of these United States on the Atlantic and the Pacific and from the Great Lakes to the Gulf.

It is a moot question—something like the one concerning the claims of priority between the chicken and the egg—as to whether the increased production of automobiles and trucks create the demand for better roads,

or whether the improved roads lure the people into buying automobiles. The argument seems to be on both sides in Florida, because once you get off a hard-surfaced road or an otherwise improved road, you are likely to become helplessly mired in the sand. On the other hand who is there that can resist the call of a straight, smooth, 15 or 20-foot asphalt pavement unrolling before him, rising now to the crest of a hill for a glimpse of rolling highlands, silver lakes and well-kept groves, then dipping into a valley where the road curves sharply along a shore line of sapphire water and where sunlight drifts down through gray strands of blowing moss?

HERE luxuriant vines bury every fence and bungalow beneath a mass of brilliant blossoms that caressingly touch your cheeks with soothing fingers while there a perfumed breeze that holds the pungency of a hot sun on fresh pine needles and ripening fruit and the sweetness of myriads of flowers, blows pure and fresh across spaces of silvery water. No wonder they buy automobiles in Florida.

Possibly no county in these United States originally was more handicapped on account of its roads than was Polk county, Florida, seven years ago. To understand Polk county's predicament a brief explanation may not be amiss.

The county lies almost exactly in the center of the Florida peninsula at a point between one and three hundred feet above sea level. In topography it is a section of rolling hills quite sharply accentuated along the "Ridge" and at Lakeland Highlands, but sloping away toward the southwest into vast stretches of flat pine lands. Its soil includes everything from rich black muck to almost pure sand, though in the main it consists of various degrees of sandy loam. The county has about 600 fresh water lakes of varying sizes, but they are useless for transportation purposes because they are

disconnected, though kept fresh by subterranean streams.

Polk county is an agricultural

GASOLINE CONSUMPTION GAINS DURING 12 MONTHS.

ACCORDING to figures given out at Washington the domestic consumption of gasoline in September was 507,934,527 gallons, against the high mark of 583,687,932 in August and 438,083,634 in September, 1921. Production in September was 536,491,988 gallons, contrasted with 549,958,376 in August and 416,913,000 in September, 1921. Stocks at end of September were 690,050,809 gallons, as against 703,738,310 in August and 515,325,998 in September, 1921.

Exports were 44,833,609 gallons, as compared with 35,747,004 in August and 35,054,800 in September, 1921, and imports, 4,563,315 gallons, against 2,829,062 in August and 7,847,424 in September last year.

The number of operating refineries in use in September was 309 against 295 in August, 305 in July and 310 in June.

county. It includes within its borders many towns—about 40 in all—the largest of which, Lakeland, has a population of about 12,000 persons. The next largest city, Bartow, the county seat, has a population of 5000. The total population of the county is about 44,000. The county ranks very high in per capita wealth and in realty values, and stands third in the amount of automobile license fees paid in the state, being surpassed only by two counties where there are large commercial centers.

There are definite reasons why an almost strictly agricultural community such as this holds a high place among the counties of Florida and they are to be found principally in its natural resources. In Polk county the finest Florida oranges and grapefruit are produced to the extent of 3,500,000 crates a year. This is 2,000,000 crates more than any other county in Florida ships, and is about one-third of the state's entire production.

In truck crops and winter fruits—especially strawberries—Polk county stands third. In general farm crop production it heads the list of all counties in the state. In Polk county, too, one-fifth of the world's phosphate is mined, while from surrounding districts is ob-

tained 42 per cent. of the total phosphate production. The phosphate mines in Polk county alone are valued at \$19,000,000. Polk county's third great natural resource is its timber, there being vast stretches of pine forests especially.

The county's manufacturing industries are small and, for the most part, are dependent upon its main resources. They include the packing of fruits and vegetables and some canning and preserving. Iron and foundry companies, saw mills and lumber factories are also to be found.

In 1915 Polk county was still a wilderness and was sadly lacking in transportation facilities. Railroads there were, but they were operating only to the principal shipping points and the phosphate mines. There were few of them because development did not warrant more. Ten years ago the town of Lake Wales, for instance, had no railroads. Today it has two.

The problem of growing and marketing the fruits and vegetables was particularly trying because of their perishability and the peculiar natural difficulties encountered with the sand roads. Older settlers amuse themselves now telling how once it took a day to go from Lakeland to Bartow, a distance of 14 miles, and return. Now it requires but a half hour for the journey each way.

It was in 1915 that Polk county

people began to realize that the rest of Florida was forging ahead of them and to grasp the reason why. The main streets of the larger towns contained the only pavements in the county. But the board of county commissioners that year took matters into its own hands and laid a couple of demonstration stretches of hard surfaced roads. In 1916 the board requested and received a bond issue for road building amounting to \$1,500,000, the largest single bond issue ever requested, for this purpose only, in the South. Work progressed rapidly, and by 1919 the original road system of 217 miles, designed to connect every town in

the county with every other one, was complete. The county has grown so rapidly since that time that in order to keep the new towns connected with each other by hard-surfaced roads, there are now 346 miles of paved roads.

The new roads are of sheet asphalt surface laid on a clay base. To keep the cost down local products were used almost exclusively in the construction work, the clay being taken from the Bartow clay pits and local soft phosphate rock being often used for the base. Coarse sand and fine Florida limestone for use in the filler happened to be readily available.

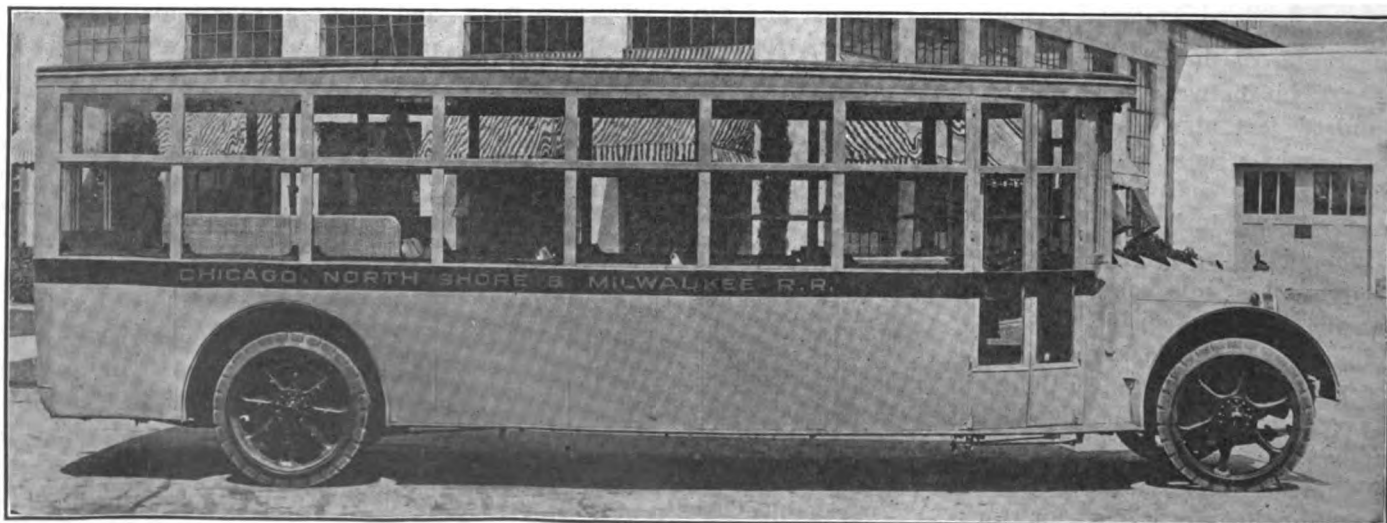
(Continued on Page 592.)

BUSES NOW TRANSPORTING MILLIONS ANNUALLY.

THREE new types of motor buses, mounted on various chassis, are being designed to meet the need for school children's transportation, city and interurban travel. The State of California leads the country in the number of such buses now in operation. In Los Angeles alone a bus station has been established where more than 500 buses leave from every 24 hours. New York state is second in the list, with more than 300 regularly organized bus companies, serving more than 400 cities, with a capitalization of \$6,000,000. In New York City alone, it is said, the Fifth Avenue Coach Company carried more than 51,000,000 passengers last year.

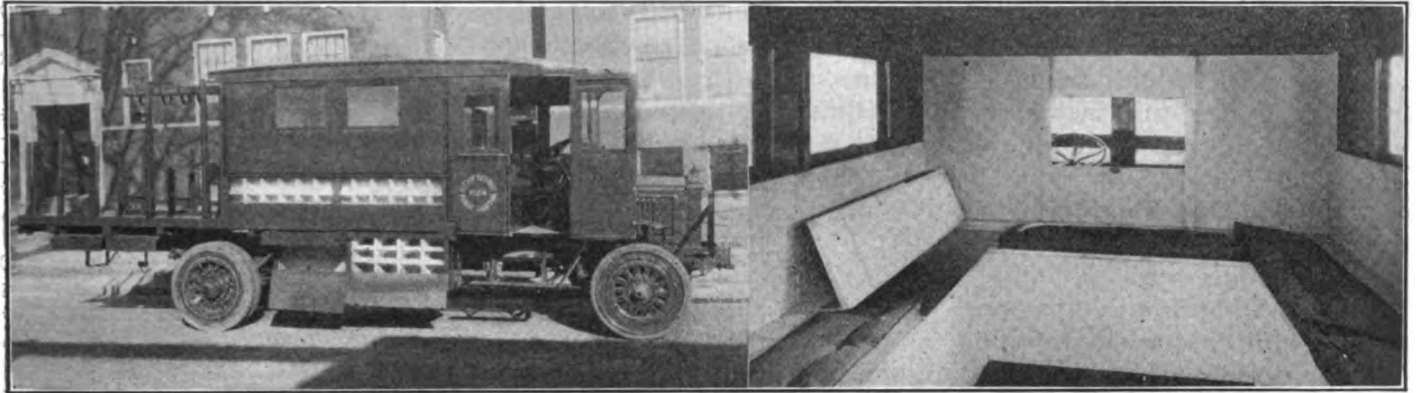
There is being spent annually for school transportation, it is said, more than \$41,000,000, nearly all of which is available as a gigantic prospect for the sale of motor trucks. Iowa, Ohio and Indiana each, spends close to \$2,000,000 for this service, and nearly every Middle and Western State spends close to \$1,000,000 annually.

FAGEOL SAFETY COACH



This Safety Coach Operated by the Chicago, North Shore and Milwaukee Railroad Combines Luxury with Safety.

Detroit Operates Specially Designed Truck



Two Photographs Show the Special Standard Motor Truck Job Designed for Use of Municipally Owned Lighting Plant of Detroit. At the Right Is Shown Compartment Used by Workmen When Going to and from Work.

A GLANCE at this illustration will show the completeness of the body equipment designed by the Standard Motor Truck Company for the municipal lighting plant of the city of Detroit.

Drawers, lockers, tool boxes, seat-

ing arrangement—all are designed for electrical equipment and maintenance service. No detail has been omitted to build the best equipment, even to employment of only seasoned dried lumber.

It is mounted on a regular $3\frac{1}{2}$ to

five-ton capacity Standard special length chassis.

Those among our readers who are supplying traction, electric lighting and telephone companies with similar equipment will no doubt be interested in these views.

Michigan Offers Highway Courses

G RADUATE short period courses in highway transport again will be offered by the University of Michigan during the winter period, December, 1922, to March, 1923.

The University of Michigan, the only institution

offering such courses for credits toward advanced degrees, has found that the schedules have been of particular interest to students throughout the country and states that the attendance has increased steadily during the last three years.

T HESE men came from national, state, county and municipal highway departments, consulting engineers, officers, contractors organizations, university faculties, companies manufacturing highway materials and machinery and the field of highway transport. Last June the university conferred six masters degrees on graduate students specializing in highway engineering or highway transport.

The board of regents, in recognition of the rapid development of the classes, which are in charge of Professor Arthur H. Blanchard, a recognized authority on the subject, has assigned 26,000 square feet of working space for the division in the new \$750,000 engineering building.

In the belief that readers of **MOTOR TRUCK** will be interested in the course which is offered, it is printed herewith in detail:

- Highway Engineering and Highway Transport.
1922-1923 Graduate Short Period Courses.
University of Michigan, Ann Arbor, Mich.
Dec. 4 to 15, 1922.
- C. E. 77. Highway Engineering Financing, Management and Organization. Professor Smith.
 - C. E. 81. American and English Highway Transport Methods. Professor Blanchard.
Dec. 18 to 30, 1922.
 - C. E. 67. Highway Transport Economics and Surveys. Professors Blanchard and Smith.
 - C. E. 72. Gravel and Broken Stone Roads Dust Prevention and Bituminous Surfaces. Professors Blanchard and Smith.
Jan. 1 to 12, 1923.
 - C. E. 73. Brick, Cement-Concrete, Stone Block and Wood Block Pavements. Professor Bateman.
 - C. E. 80. Interrelationship of Highway, Railway and Waterway Transport. Professor Riggs.
Jan. 15 to 26, 1923.
 - C. E. 69. Highway Laboratory Research. Professor Bateman.
 - C. E. 70. Highway Structures. Professor Gram.
 - C. E. 82. Highway Transport Costs and Record System. Prof. Smith.

Jan. 29 to Feb. 9, 1923.

- C. E. 68. Bituminous Macadam, Bituminous Concrete and Sheet Asphalt Pavements. Professor Blanchard.
 - C. E. 84. Highway Transport Management. Professor Smith.
 - M. E. 40. Mechanism, Operation and Maintenance of Motor Trucks, Tractors and Trailers. Professor Lay.
Feb. 12 to 16, 1923.
- Ninth Annual Michigan Conference on Highway Engineering.
Feb. 19 to March 2, 1923.
- C. E. 71. Highway Specifications, Contracts and Jurisprudence. Professor Riggs.
 - C. E. 79. Highway Transport Legislation and Traffic Regulations. Professor Blanchard.
March 5 to 16, 1923.
 - C. E. 75. Highway Engineering Seminar. Professors Blanchard and Bateman.
 - C. E. 76. Highway Engineering Theory and Design. Professor Smith.
 - C. E. 78. Earth and Sand-Clay Roads and Grading Machinery and Operations. Professor Bateman.
 - C. E. 83. Highway Transport Seminar. Profs. Blanchard and Smith.

Will License Fees Be Higher?

THERE are many indications throughout the country that automobile legislation this year will be directed in many states toward the imposition of higher fees upon motor trucks on the plea that this is necessary to pay for the higher costs of road maintenance and repair.

Stricter regulations against overloading will also figure in the proposed legislation. Many eastern states already have positive laws against the overload evil, New York having adopted such an act at the last legislative session.

SEVERAL bills are being prepared, it is announced, for the coming session of the Illinois Legislature to deal with these and other automotive problems. Senator Frank Hanson is submitting to the automobile clubs there a bill he has drafted in the interests of highway safety and the elimination of accidents. It proposes to hit the speed motorist at the first offense.

One section of the bill stipulates that no person shall operate a motor vehicle upon a public highway at a speed greater than 25 miles an hour while passing another vehicle moving in an opposite direction. No person operating a motor vehicle shall pass a vehicle standing upon such highway at a speed greater than 10 miles an hour.

The penalty provided for a violation ranges from a \$10 to \$200 fine, except where there is a personal or property injury, when it provides a fine of \$1000, imprisonment from one to five years, and prohibiting from operating a car upon the highways of Illinois for a period of two years from the date of the accident.

It is believed by Senator Hanson that the last clause will have a greater effect in the reduction of speed when passing another car than the fine or imprisonment penalties.

Another bill directed against motor trucks in Illinois will stipulate that all commercial motor vehicles must be able to stand inspection in relation to tires and tonnage; that owners of such vehicles will be required to pay all damage caused to highways through improper tires or excess tonnage or other causes; and also a fee proportionate to the number of passengers and distance

handled. It also taxes the tonnage of freight and express, proportionate to the amount of mileage.

All revenue derived from such a fee system will be placed in the fund of the State Highway Department to be utilized for the upkeep of the roads.

There is also an indication that a thorough highway patrol system, patterned after the Wisconsin system, may be adopted for Illinois. There is opposition to a constabulary force, but a bill is being prepared which will omit some of the undesirable features while providing for a patrol system which will not only produce results in the way of bringing about the arrest of those who may be wanted for some crime, but will also produce the desired supervision and maintenance of the new highways.

GOLD DUST TWINS TO HAVE SPECIALLY BUILT AUTOMOBILE?

AN ORDER is reported to have been placed at an Indiana automobile factory for a specially built car which probably will be the most elaborate to be seen on American roads when it is turned over to its owner. The price is \$25,000 and the fittings will be of gold.

All exposed parts will be plated in 20 to 24 karat gold, including head lamps, cowl, spot, tail and spot lamps, side lamps, hub caps, winged motometer, hood hooks, catches and locks. Indeed there will be 958 separate parts thus to be treated.

The rear part, seating five passengers, will be upholstered in imported gold velour. The front compartment is arranged for a footman as well as chauffeur, and is also elaborately fitted. The motor is a twin-valve type, generating 125 horsepower, and when complete the car will weigh 2½ tons.

Opie Chenoweth has accepted a position as research assistant in carburetion in the engineering experiment station of Purdue University, West Lafayette, Ind. He was formerly engaged in publicity work connected with the selling of securities for the People's Loan & Trust Company, Winchester, Ind.

Charles J. Hegenauer has resigned as automotive draftsman for the Ward Electric Motor Vehicle Company, Mount Vernon, N. Y., and has joined the engineering department of Durant Motors, Inc., Long Island City, N. Y.

William D. Sargent, president and treasurer of the Bayonne Steel Casting Company, Bayonne, N. J., has been elected a director of the Mack Trucks, Inc., New York City.

Elton W. Viets has severed his connection with the General Motors Research Corporation, Dayton, O., where he was employed in the dynamometer room. His plans for the future have not been announced.

H. Oliviere has severed his connection with the Richard Carter Company, Gulfport, Miss., where he has been machine shop foreman for the past 15 months. He has not announced his plans for the future.

G. Lester Jones has accepted a position as engineer doing research work, designing and testing of heavy oil high-compression engines for the Sperry Gyroscope Company, Brooklyn, N. Y. He formerly attended Columbia University, New York City.

Ralph H. Hurd has accepted a position as draftsman for the Sinclair Refining Company, Chicago. He was formerly engineer for Libby & Huls, also of Chicago.

Charles H. Jacobsen has become sales engineer for the Moreland Motor Truck Company, Los Angeles.

K. W. Hooth has accepted a position with the Fuller & Sons Manufacturing Company, Kalamazoo, Mich.

Fred R. Lockwood, formerly sales manager for the A. J. Detlaff Company, Detroit, is now engaged in selling Ford cars, trucks and tractors at Phoenix, N. Y.

Clifford S. Miller has been elected secretary and treasurer of the Continental Tool & Supply Company, Indianapolis. He was formerly sales engineer for the Gibson Company, also of Indianapolis.

Robert W. Davis has accepted a position as designing engineer for the Dickinson Cord Tire Corporation, New York City.

C. F. Keene has severed his connection as sales engineer in Chicago for the Ensign Carburetor Company, Los Angeles, and has gone into business for himself in Denver, handling several lines of automotive equipment.

H. H. McCarty was graduated from Purdue University, West Lafayette, Indiana, and has been made research engineer for the General Motors Research Corporation, Dayton, O.

Robert E. Wilson took up his new duties in the research laboratory of the Standard Oil Company, Whiting, Ind., on Oct. 1, having resigned as director of the research laboratory of applied chemistry in the Massachusetts Institute of Technology, Cambridge, Mass.

Grafters Handicap New York Bus Operators

L OADING of 369 per cent. on the municipally supervised Avenue C bus line, the greatest single instance of overcrowding on any transit line in the city, was disclosed recently at the Transit Commission's investigation of bus lines, undertaken in connection with its general investigation of the transit situation. The highest previous point of overcrowding re-

vealed by the commission's investigation was 320 per cent. in trains passing through the Centre Street Loop. The crowding on one of the city administration's bus lines was thus 49 per cent. greater and far above anything disclosed in the Interborough subways, concerning conditions in which Mayor Hylan and his associates have made frequent complaint.

T HE testimony concerning the overcrowding on the city bus lines, which, although threatened by injunction, are still operated under the supervision of Grover A. Whalen, commissioner of plant and structures, was given by Walter T. Edgerton, the commission's supervision inspector. Mr. Edgerton testified that the observation which disclosed the 369 per cent. loading were taken on Oct. 13 in the morning rush hour of west bound traffic, with the observer at Houston street and the Bowery. According to the observer, there were nearly three times as many standing passengers as seated passengers in the period from 7:45 to 8 o'clock.

Mr. Edgerton's testimony indicated that after the rush period the number of standing passengers dropped quickly, which lead former Justice Clarence J. Shearn, special counsel of the commission, to say he believed this overloading could be corrected by a coordinated bus

system with a central head to supply buses where they were most needed.

Testimony that political influence and in certain cases money were necessary to obtain and hold the daily permits issued to bus operators was given by four former operators, who said they had their permits taken away from them because they did not vote at the last city election, at which Mayor Hylan was a candidate. One of the witnesses said he was told he could get his permit back by paying \$200, and understood that an associate, dropped at the same time he was, had done so. All the witnesses agreed that they had been told that it was desirable to join a political club, presumably a Democratic club, and two from New Jersey said they had each rented a room here to gain a technical residence.

The four witnesses testified that their profits on "fat" lines had averaged \$20 a day over all expenses

including depreciation on their buses. A hint of another possible method of "graft" other than by direct payment was contained in the testimony of one witness who said that a salesman for an automobile company tried to sell him a bus for \$4000 on the promise that he would get him a profitable assignment.

Peter Ruocco, who said he was a justice of the peace in Paterson, N. J., testified that he began to operate a city supervised bus in November, 1919, and had continued until March 4 last, when his permit was stopped on "orders from headquarters." He said he had asked why and was told that it was because he had not voted at last city election.

Ruocco said his bus cost him \$3000 and that he had taken in an average of \$32 a day on the Chambers street line and \$35 a day on the Madison street line. He added that it cost him about \$20 a day to run his buses, including the wages of two chauffeurs at \$5 each, a premium of \$650 for \$5000 insurance and all overhead. He said that one time when there was a strike and only five buses running he averaged \$70 a day for a week. In reply to a question Ruocco admitted he had to pack passengers in tightly to make \$35 a day.

"Pack them in like sardines?" asked ex-judge Shearn.

"Like herrings, we called them," replied Ruocco.

"Would you say that you could make your expenses on a five-cent fare and give everybody a seat?" Judge Shearn asked.

"Oh, no," replied Ruocco, "you have to have them standing. You couldn't give everybody a seat and make money unless you have a big bus to seat 50."

TRUCK SALES BAROMETER OF BUSINESS SAYS DAY.

P ROOF that big business interests through the country are at last on a normal schedule again is cited by Vance Day, general sales manager of the General Motors Truck Company of Pontiac, Mich., who asserts that for the first time in two years large fleet owners are again buying trucks on a large scale.

Mr. Day believes that an almost infallible barometer of general business conditions can be found in the truck market. Transportation, he says, is the one thing which indicates the growth or falling off of any business.

When the business depression of last year first became noticeable to the general public it had been noted long before in the truck industry.

Similarly, Mr. Day believes that business throughout the country must be on a sound basis as the truck transportation field has picked up tremendously in the last few months.

It is his contention that instead of receiving small orders for one or two trucks as they have been doing the five big packers, owners of some of the largest truck fleets in the world, are again in the market with the Standard Oil Company and other large fleet owners.

The truck company, Mr. Day says, has been filling single orders for 20 and 25 trucks at a time and their salesmen report that still larger orders will be forthcoming soon.

In all, Mr. Day believes that the year 1923 will see an increased market for the motor truck industry and he believes that many new enterprises will be started during the year which will demand motor trucks to meet their transportation problems.

Ruocco said a man named Meighan tried to get him to buy a new bus and offered, if he did buy it, to get him on the 86th street line, which the witness said was the "cream" of all the bus lines of the city, and that if he didn't get the line he need not pay for the bus.

Ruocco said that there formerly was a good deal of fighting between the drivers for position in line and that certain drivers would "drag" or drive slowly so as to pick up more fares than they were entitled to. He said that condition has been somewhat corrected recently.

Frank Angelioni, another former bus operator, who lost his permit after he had failed to register for the last election, supplemented Ruocco's testimony, and said a friend of his offered to introduce him to a man who would get his permit back for \$200.

"I said, no I will stay off and not pay \$200," Angelioni said he replied.

"Who was the fellow he was going to introduce you to?" Mr. Shearn asked.

"He did not tell me the name," said Angelioni. "There was some club on Grant street."

"The Pat Paul Club?"

"I think it was that. I didn't give up and I never got back."

"Did you ever hear of anybody who was turned off like you were and who did pay money and did get back?" Judge Shearn continued.

"Why, Joe Tino," replied Angelioni.

"Joe told me, 'I go back on Madison street, but it cost me \$200.' I don't know if he went on the line."

"Yes, he is on the line," said Mr. Shearn. "I found out the other day. What did he say you ought to do?"

"He said, 'Why don't you pay \$200 and go on the line?' I says 'No.'"

"He said you were a fool?"

"Something like that," Angelioni replied, with a smile.

Hyman Weisberg testified that he had also had continuation of his permit refused because he did not register last year. Weisberg said he had joined the Jackson Democratic Club on the Bronx, but insisted that

GEN. LEN. SMALL OF ILLINOIS ENDORSES MOTOR BUS.

AMONG the most outspoken advocates of the motor bus is Gov. Len Small of Illinois, who recently issued the following statement in favor of municipally operated buses for Chicago:

"Mayor Thompson's establishment of people's ownership five-cent fare motor bus service is a great thing for Chicago. It is more modern, more economical and faster than surface or L line electrical trains.

"Transportation, like everything else, is advancing and has greatly improved in the last 20 years. It is entirely unnecessary to load up the streets with steel rails and heavy, noisy tram cars.

"First we had the horse cars, which were followed by the cable cars, which, in turn, gave way to electric cars. Now we have the motor bus. Chicago has ample authority to acquire a motor bus service, owned and operated by the people. For, after all, the streets belong to the people and anything necessary for their accommodation should be done.

"The streets were not intended solely to give everybody a chance to make money. That being the case, the streets should be used to give the people the most modern and economical transportation available. The motor bus accords that."—*Republican Round Table.*

no one in the club had anything to do with regaining his permit. He said the reason he had failed to register was because his naturalization papers were with his furniture in storage and that the registration board had refused to register him without them. He said he did not know just what his brother-in-law had done, but assumed he had explained this.

Louis Lambert, another former

bus operator, explained that he had lost his permit because he was not a citizen and that he had tried to get it back through politics but failed. Mr. Edgerton then resumed his testimony regarding conditions on bus lines and had a good word to say for the line operated by the Concourse Motor Bus Company on the Grand Concourse in the Bronx. Mr. Edgerton said that buses were of the two-deck type and that they were run on regular schedule and were not crowded.

GOOD ROADS.

(Continued from Page 588.)

In the larger towns of Polk county the motorist sees a few brick pavements. The remainder of the city streets, as well as all the county roads, are now of asphalt. And those who pass from the brick roads of neighboring counties, fine though they are in many instances, beam with pleasure at the ease encountered in traveling along Polk county's fine new roads.

The new highways have now put the county in the forefront of the fruit and vegetable producing districts. Thousands of acres of new orchards and vegetable gardens, as well as general agricultural lands, have been opened to production and the marketing of the county's products has not only been rendered more expeditious, but has been greatly reduced in cost. The people of Polk county are now numbered among the most enthusiastic advocates of good roads in the country.

George Ingalls Black, Jr., has accepted the position of plant superintendent with the Felstone Company, Biltmore, N. C. He formerly attended the University of Michigan, Ann Arbor, Mich.

J. R. Bayston, who was formerly head of the automotive department of the Coyne Trade and Engineering School, Chicago, is now president of the Chicago Automotive Institute of that city.

W. C. Rowles has been appointed works manager for the Belle Isle Boat and Engine Company, Detroit. He was formerly engaged in experimental work with the Delco Light Company, Dayton, O.

G. K. Scribner has resigned his position as vice president and factory manager of the Boonton Rubber Manufacturing Company, Boonton, N. J., to become president of the Boonton Molding Company, also of Boonton.

Greenfield Bodies Widely Used

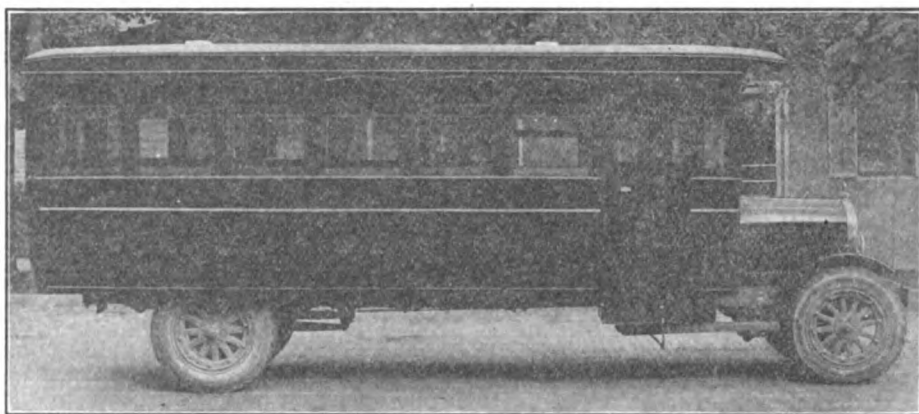
GREENFIELD BUS BODY COMPANY, Greenfield, O., known throughout the trade as a manufacturer of high grade bus bodies, reports an especially fine business in their entire line, stating that there is every indication of future trade being especially satisfactory.

This company, which it will be remembered, is a successor to the C. R. Paterson Sons Company, builders of quality vehicles for more than half a century, manufactures a knock-down bus body which can be packed for shipment so that it takes up very little room and saves greatly on the freight charges. Arrived at its destination the body can be put together in an hour and a half and is so designed as to fit any chassis.

BUS bodies built by this company are used throughout the country and have found high favor with operators who state that passengers are especially partial to their easy riding qualities and general efficiency.

Body number 70, which is illustrated, is a good example of the jobs turned out by this concern. The frame work is of clear heavy oak and ash and is strongly reinforced with iron. The roof and floor are made of a groove and tongue first quality poplar, the former covered with exceptionally heavy and closely woven oiled duck. Panels used in this particular body are of 20 gauge clear metal. The built in windshield is of the full ventilating type.

The front entrance of the bus is a sliding door, pay-as-you-enter type, which is controlled from the driver's seat and there is an emergency door in the rear. The windows are designed so that they cannot rattle and are constructed of two sashes, the lower sash being of the drop



Greenfield Bus Body Company, Well Known as a Manufacturer of High Repute Has Distinction of Having Its Product Installed in Nearly Every State in Union. Model 70, Which Is Illustrated, Shows Superb Construction of Bodies Built by This Concern.

proximately 16 persons; 14-foot body seating 20 persons; 16-foot body seating 24 persons, and an 18-foot body which seats 28 persons.

Specifications of this job are as follows:

FRAMEWORK—Selected hard wood—Base, lengthwise sill, 2 by 6 inches. Crosswise sills, 2 by 8 inches. Posts, uprights, 2½ by 2 inches. Rib rails, 1 by 7 inches.

SIDE ELEVATION—Left, showing front entrance—21-passenger body, 16 feet. Extreme height, 75 inches. Length, outer, 191 inches.

WINDOWS—Four, 24 by 30 inches; upper sash, 24 by 12 inches; lower sash, 24 by 18 inches; one, 19 by 30 inches; upper sash,

Back, 3½ inches with swell to four inches. Roll top type. Height, 21½ inches from seat base. Height, 36 inches from floor. Seat supports—Posts, hard wood, 1½ inches square. Wrought iron braces, 1½ by 5/16 inches. Aisle—Center, 17 inches. Between seats, 11 inches. Rear Door—Emergency exit 24 inches wide. Built down to seat line or floor, securely fastened inside.

UPHOLSTERING—Packercloth—A Grade—Cushion—Special spring construction, bound with heavy white duck.

TOP—Exterior, special slatted construction. Black oil duck covering. Interior, special wood fiber paneling. No exposed rib rails or supporting irons.

WINDSHIELD—Divided Type—Lower—Two units 8¼ by 26 inches rigid. Two units 15½ by 26½ inches ventilating style, equipped with automatic windshield hinges. Crystal sheet or polished plate glass.

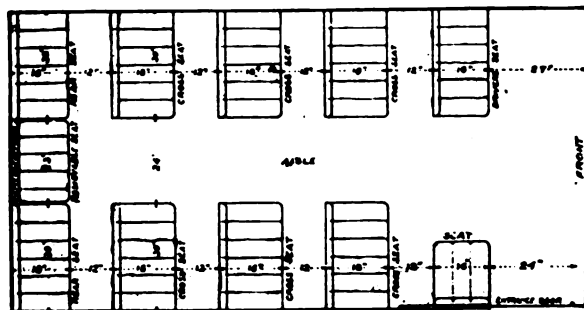
FINISH—Exterior—Painting brewster green, white hair line striping. Other colors optional. Interior—Window hardware, polished brass sash locks and stops; electric push buttons, pearl center, on side windows operating buzzer placed above windshield. Two dome lights operated by switch from driver's seat. Painting, ceiling panels, cream. Side panels, cream or brown.

GENERAL CONSTRUCTION—Side panels 18 gauge auto body steel. Hand forged iron, braces on all side posts, seat supports and top rib rails. A grade material and high class workmanship throughout.

PRICE—14 passenger, \$1100; 18 passenger, \$1150; 22 passenger, \$1204; 26 passenger, \$1350; 30 passenger, \$1500. Plus five per cent. excise tax. F. O. B. factory. Subject to confirmation.

Ira L. Johnson is now associated with the Minneapolis Steel & Machinery Company, Minneapolis. He was formerly machinist for the Gilbert Manufacturing Company, Aberdeen, S. D.

John Ericson has become affiliated with the Ralph De Palma Experimental Department, Los Angeles, Cal., as designer.



Floor Plan of Greenfield Bus Body Number 70.

type. The seats used in this body are of spring cushion type and special attention has been given to insure the passenger's ease and comfort. Rattan seats also are furnished if desired.

This bus has a width of 84 inches and is 72 inches high. It may be had in a 12-foot body seating ap-

19 by 12 inches; lower sash, 19 by 18 inches; one, 25 by 25 inches; upper sash, 25 by 7 inches; lower sash, 25 by 18 inches. Double strength A glass.

FRONT ENTRANCE—Sliding Door Type—Door, 24 by 81 inches; six panels upper, 11 by 8½ inch glass; four panels lower, 15½ by 8½ inches solid. Door controlled by ratchet type lever on left of driver's seat. Vestibule entrance with two steps.

SEATING PLAN—Right—Rear seat, cushion 16 inches wide. Other dimensions same as cross seats. Cross seats, height from floor, 14½ inches. Cushion, 14 by 32 inches; five inches front, four inches rear.

PERTINENT POINTED

A FEW WORDS ABOUT PROPHETS.

PROPHETS of old who correctly enough predicted the telephone, the telegraph, the steam engine and the automobile (and every one of these was prophesied by seers) were looked upon as visionary. They were held to be suffering from mental aberration, were called victims of hallucination—and yet they foretold with accuracy. It would seem politic, in view of the startling number of such prophecies that have come true, for the scoffer to withhold his derisive comment since in the end it is usually he who merits the ridicule.

An incident that illustrates this dates back to a few years ago when we took our first ride in a motor bus. It wasn't much of a bus either—just a three-ton truck with plank seats, but it served as the only connecting link between two summer resort towns and was well patronized. In the course of the trip mentioned I spoke to a man who sat beside me, commenting on the greater speed possible with the truck as compared with the ancient electric line with its two cars which formerly had carried the passengers. The man, accounted by the villagers to be "queer," was a rather shiftless chap who did odd jobs around the town. He agreed with me—and out of the depths of his ignorance he made a prediction.

"I look to see automobiles that'll carry a dozen or 15 people and all their baggage from coast to coast. Wait and see," he said, a fanatical light in his eyes. "No trucks like this one, but regular swell automobiles 20 feet long maybe; plate glass windows; great heavy upholstery; pneumatic tires 10 inches through. I might never ride in one of 'em, but they're coming sure as fate."

The smug cashier of the local bank seated at my right overheard the conversation. He looked at me and winked and tapped his forehead in significant manner.

But already the prediction has come true. "De Luxe" passenger and baggage carrying buses equipped with every luxury are operating in all parts of the country and there is at least one such that makes the trip from the Atlantic to the Pacific without difficulty of any kind.

The middle west is the scene of operation of many fleets of finely appointed buses by which

one may tour to various points of interest, the length of the trips varying from two days to nearly two weeks. One of the newest of these systems, inaugurated within the month, starts on schedule time from New York and takes in all the principal points of interest between that metropolis and Atlantic City, the itinerary including Trenton, Philadelphia, Gettysburg, Luray Cavern and Washington. Guides and lecturers accompany the parties with the result that the passengers get complete information which would never be gained from a cursory perusal of the guide book. Another eastern bus line makes trips from Boston to Niagara Falls, while still another runs to Montreal—all of which presages a time when much of the transcontinental passenger transportation will be handled by bus system.

It's best to withhold satirical comment at all times—as a matter of policy if for no other reason—it's the sensible thing to do with regard to prophecies, regardless of how far-fetched they may seem because they have a habit of coming true, as witness the foregoing example, which is but one of the many that prove the truth of the contention. Man has developed illimitable ingenuity, even to the point where everything obviously is possible—which has greatly simplified the work of the prognosticator who now may prophesy nearly anything with fair assurance that it will come to pass.

PASS THE OLIVE OIL.

AN EXTRACT taken from the annual report of the Secretary of Commerce says, "The management of our principal railways today by all the tests of administration, of load factors, of mechanical efficiency, etc., is the most efficient transportation machine in the world in so far as it is not limited by causes beyond the manager's control."

In other words, the management is pretty good—all things considered—and we for one are highly pleased at being corrected in our former erroneous belief; it may be recalled that we have criticised it on various and sundry occasions.

COMMENT OF THE DAY

PENALIZING PROGRESS.

"MAKE smooth the way of progress," says an old proverb evidently written long before the advent of the motor truck. It seems as though the word "smooth" in the first line should well be changed to "rough"—in order thoroughly to line up with the apparent spirit of the times with regard to those who make the laws governing the purchase and ownership of the motor truck.

The first thing the buyer does is to pay a tax to the government for the privilege of owning the machine. The next thing he does is to pay a tax to the state and the third step is to pay a tax to the town in which he lives, following which he is taxed for the gasoline and oil he uses. He buys a spare tire and pays a tax on that; the state law makes him put on a mirror and he pays a tax on that. Following the payments of these many taxes he pays another tax for the privilege of going into business, after which he is free to go out and, by putting a small overload on his machine, pay a fine.

It would seem that the logical thing to do would be for the government to encourage inventors and developers to do their best work by remitting all taxes possible on their product, passing these taxes on to the users of the old fashioned methods of doing business—thus the trucker who persists in sticking to the use of the horse-drawn vehicle would be forced to pay a tax the size of which would make him speedily take to the modern means of freight hauling. By this arrangement the farmer, who, disregarding the modern methods of agriculture continued to plow his fields with the horse, sow the seed by hand and separate his grain with an ash "swingle," would likewise be forced to use modern farm machinery or else pay a substantial tax on his horse, his plow, his scythe and his flail. The scheme, in short, would be to penalize all inefficiency and reward all efficiency; obviously the idea as outlined is purposely overdrawn, but seriously speaking, the present laws for some inexplicable reason seem designed solely to hamper progress instead of to aid it.

Some there are who express surprise that such should be the case in a country like America, which in the last 150 years has accounted for a

great majority of all progress along material lines; the reason isn't far to seek when one stops to think of the great political influence the already established industries have—not only in Washington, but throughout the entire country.

TRUCK AND TRAILER COOPERATION.

COMPETITION between the motor truck builder and the trailer manufacturer should not exist; this fact is being recognized more and more until at the present time a distinct tendency toward cooperation between the two is becoming apparent.

The most striking example of this is seen in a recently issued catalogue compiled by a motor truck manufacturer and a trailer builder in collaboration. This catalogue, which graphically illustrates how the truck and trailer may work together to the common good, marks a long step in the right direction. Especially is there need for the one manufacturer to recognize in the other a business ally in these days of legislation against excessive truck loads, as the trailer can be used to splendid advantage to enable the carrying of loads, the size of which, if piled on to a motor truck would subject the operator to arrest. The truck alone—no matter how heavily overloaded—cannot begin to handle the load that a motor truck and trailer will accomplish where the weight is spread over six or eight wheels.

The trailer has a great future as a developer of both short and long haul freight; it will play a most important part in highway development, too—a fact that the thinking truck builder should not overlook and one that is recognized by several of the more progressive manufacturers who already are building power haulers to be used in conjunction with trailers.

FLIVVERBOOB?

FLIVVERBOOB: Wasn't that the word? We seem to recall hearing the term used, but just what it referred to we can't say. Anyone relieving our ignorance will receive our thanks and 10,000 Russian roubles, which may be exchanged at any store for a carton of applesauce.

Motor Truck Markets Abroad

THE Swedish automobile manufacturing Company, A.-B. Scania-Vabis, has received an order from the Swedish army for the delivery of 35 army trucks during the course of the winter, according to a report from Trade Commissioner Sorenson. The order is said to show the production capacity of the works and also the popularity of this make of truck, of which 50 have already been delivered to the army. Although it is thought that the Swedish need for motor trucks can be supplied by the home industry, the Swedish state railways have recently bought three trucks from the German firm, Deutsche Werke A.-G., Kiel. These trucks have a seating capacity of 75 persons and are said to be 40 per cent. cheaper to operate than steam.

Portuguese East Africa Motor Vehicle Market Depressed.

The motor vehicle market in Portuguese East Africa is in a state of great depression which has recently been accentuated by a new currency law which prohibits transactions in any but the provincial currency. This law has so disturbed the industry that the few orders for cars in course of delivery have been suspended and one case stopped en route. It is not generally believed that this condition will exist for long and with the revival of trade there should be a good market for American cars, says Vice Consul Gross, Lourenco Marques.

Many Motor Buses in Algeria.

Vice Consul Elkington reports that there were 1293 motor buses and trucks in service in the three departments of Algeria as of Dec. 31, 1921. Of this total Algiers lead in the registration of buses with 245, while Oran had 502 trucks. Of the total of these two classes combined Algiers had 683, Oran 510 and Constantine 100.

Fiat Company (Italy) Factory Working Overtime.

The Fiat Company of Turin, Italy, which was working only part time not many months ago, has re-

cently put on a night shift in order to keep up with the demand for its products, says Commercial Attache MacLean. This large advance in sales is partly due to the increase in the import duties of foreign motor cars and trucks into Italy, which has naturally increased the price of such cars and thereby increased the demand for domestic makes.

Conditions Poor in Hanover and Oldenburg.

The delivery of raw materials to the motor vehicle industry in the Province of Hanover and the State of Oldenburg was exceedingly unsatisfactory during the second quarter of 1922, Consul Stewart, Bremen, reports. As in other industrial branches, factories complained of very poor transportation facilities and frequent losses in transit by railways. The demand in Germany

was good, but the prices obtained left very little for profit and it is doubtful whether the domestic market can be maintained at the same level if expenses continue to rise as they have heretofore. The export demand of foreign markets has suffered from price reductions quoted abroad.

Netherlands Show Interest in Motorized Tramways.

Increasing interest is being shown in the motorizing of interurban railways in some parts of Western Europe, according to a report from Consul General Anderson. At Amsterdam a small interurban tram leading to one of the suburbs is being operated successfully by the adaptation of a popular low priced American motorcar as a tractor. The usual automobile wheels and tires are being used, the tractor drawing the tram car by a steel coupling.

DECLINE IN SEPTEMBER AUTOMOBILE PRODUCTION.

FIGURES received by the Department of Commerce through the Bureau of the Census show a marked seasonal decrease in the production of both passenger automobiles and trucks in September. The total production of passenger cars in September was 186,562, compared with 249,225 in August, while truck production in September amounted to only 18,843, as against 24,200 in August. The September production is the lowest since last March, but is considerably above the figures for September, 1921, when the total production was reported as 144,669 passenger cars and 13,648 trucks.

The following table gives the total production for each of the last nine months. With a few exceptions the reports each month are from identical firms and include approximately 90 passenger car and 80 truck manufacturers. September figures are subject to slight revision when all reports have been received.

AUTOMOBILE AND TRUCK PRODUCTION.

(Number of Machines.)

1922	Passenger Cars	Trucks
January	81,693	9,416
February	109,171	13,195
March	152,959	19,761
April	197,216	22,342
May	232,431	23,788
June	263,027	25,984
July	224,057	21,357
August	*249,225	*24,200
September	186,562	18,843

*Revised.

"Journalistic Buses" for New York?

THE shopping district of Manhattan is to be invaded within two months by the journalistic bus system invented by Charles Bright of Elmhurst and now running in Brownsville, according to Mr. Bright.

Forty buses will run over a kite-shaped route, not yet made out in detail, but taking in Times Square, Broadway to Wanamaker's and back on Fifth avenue in the daytime, according to Mr. Bright.

The bus system will do short hauls in the white light district in the evening.

"RIDING in these buses will be strictly invitational, as it is now on my bus route in Brownsville," said Bright. "Nobody can pay to ride in them, but anybody who buys my little newspaper may have a free ride.

"These buses will make a loop of the shopping district in the daytime, taking in Pennsylvania station and the Grand Central. Anybody who has a copy of my paper can wave it and stop the bus, tear off an "ear," give it to the driver, and have a ride at my expense."

Bright, who testified before the Transit Commission recently, shocked that body by his careless talk of tearing off "ears," but "ears" is a technical word in the special vocabulary which has already accumulated about the literary traction business invented by Mr. Bright. The "ear" is the upper right hand corner of the front page and the upper right hand corner of the back page of his eight-page bi-weekly journal, *The Brownsville Special*. On each ear is a printed invitation to ride on one of Mr. Bright's 150 buses at his expense. This periodical sells for 10 cents a copy.

"The bus stops any time you wave a *Brownsville Special* at it," said Mr. Bright. "If you have no copy of this publication you can obtain a ride by subscribing for it, as you enter the bus. The driver has subscription blanks which sell for 50 cents. Old subscribers are permitted to do this, but anybody who does not understand the system is simply told to drop in at the nearest store and buy a paper. We soon found we could not afford the time to stop and explain things to people who do not understand the system. We just put them off and they can make inquiries at the nearest store. Every store along the route carries these

papers for sale and many of them advertise in it.

"I run 50 buses or coaches and have no franchise or permit and do not need any. I am not a common carrier. I handle selected passengers by invitation. They cannot put me off the streets, as things now stand, and they cannot legislate me off. The Legislature cannot pass any constitutional act that will hurt my business.

"I have taken the matter up with several department stores in Manhattan and have received such encouragement that within a month or two I will put my first set of coaches, 40 or more, doing a loop in the shopping district.

"I am not primarily a transportation man. I am a civil engineer, and 25 years ago I built and owned a

street railway system in Buenos Aires. I am not a journalist, either, and am building up *The Special* without much experience. When I get running my shopping and White Light Service I intend to publish light comment on things that would interest the people who ride in that part of the city and I will need the services of some bright energetic young man in the news line.

"There is nothing new about what I am doing. It is a very old thing. The daily papers of Boston did it 30 years ago. It was natural for me to adopt this means of increasing the circulation of the paper.

"When I go into Manhattan I intend to insure the lives of subscribers for \$1000 cash. The papers will not only contain the invitation ears, but coupons which can be torn off and paid down as premiums on the life insurance."

Mr. Bright told the Transit Commission that he believed all newspapers would shortly adopt this idea. Explaining the reason for issuing subscriptions for no more than the next five forthcoming copies, the traction press magnate continued:

"If we sent it by mail, especially in that district, about half the papers would be lost or stolen. As it is they go to the corner grocery store and tear off one of these coupons. They get a paper at the time when they want it. Sometimes they take it when they are going home, and that is why we have two rides on the paper, to make it valuable to the advertiser."

"Is the grocer paid any commission for his services?" asked Chairman McAneny.

"None, whatever. He does it as a matter of convenience," said Mr. Bright. He added that he made no money except through the sale of advertising.

"FIVE GALLONS OF PRICKLY PEAR JUICE PLEASE."

A NEW motor spirit, made from prickly pear juice mixed with other chemical, has proved so successful in tests, according to a report to the Department of Commerce from Trade Commissioner Stevenson, that a company with \$100,000 capital has been organized to exploit it. This new product is called "Springbok" Motor Spirit. It was invented by A. C. de Villiers, an attorney of Edenburg, in the Orange Free State, and the formula is a secret.

According to press reports, the spirit has been severely tested on various makes of cars, and is highly recommended, being non-corrosive, odorless and equal or better to gasoline in power and flexibility, a mileage of 22.4 being obtained in a six-cylinder car. Unlike some of the other substitutes, it can be started easily in the cold. It has also been tried out by farmers both for tractors and cars, and it is stated, no difference could be detected between running on gasoline and on the new fuel. No special carburetor adjustments are necessary, which is a handicap to some of the previous substitutes invented in South Africa.

Highway Board to Help Home Seekers

A NATIONWIDE investigation into the uses to which the motor car is put by its purchasers, conducted by the National Automobile Chamber of Commerce, discloses that in 135,000 instances in 60 cities throughout the country the motor car has been used as a vehicle of relief from high city rentals, the owners of this number of automobiles having moved from the city to the suburbs and depending solely upon their cars for transportation between their offices and homes.

The result of the chamber's investigation is to be placed before the forthcoming conference of the Highway Education Board at Washington, D. C., 26, 27, 28, on which the chamber is represented.

THE conference has been called by John J. Tigert, United States Commissioner of Education, chairman of the board, to discuss all phases of highway construction, but primarily to continue steps, inaugurated two years ago to further the educational work of colleges and universities numbering highway engineering among their courses.

Thus far the investigation is incomplete. The 60 cities from which

reports have been received include only three of the chief cities of the country, Baltimore, Detroit and Cleveland. The figures do not include New York, Boston, Philadelphia, Chicago, San Francisco, St. Louis, Los Angeles or other cities of approximately their population. The combined population of 60 reporting cities is less than 8,000,000.

If the same ratio is maintained throughout the rest of the United

States, not less than 500,000 automobiles have been used during the past three years in the fight against high rents.

Baltimore and Detroit are tied for first place in the number of motor cars used primarily to carry workers to and from their work each day. In each case the number is approximately 25,000. Louisville is rated next, in returns compiled thus far, with 20,000. Oak Park, Ill., and Cleveland are rated at 5000 cars each, Toledo at 3500; Tampa, Fla., Dayton, O., Pasadena, Cal., and Casper, Wyo., at 3000 each. Eight cities—Danville, Ill., Waterloo, Ia., Nashville, Tenn., Winston-Salem, N. C., Tulsa, Okla., Houston, Tex., Richmond, Va., and Bellingham, Wash., are reported to the chamber as having 2000 cars each which have been devoted to this purpose.

I. D. Rocap has formed a partnership, doing business under the title of Lynch & Rocap, city of Washington, for the sale of all automobile accessories and parts.

Clement Booth has severed his connection with the Heald Machine Co., Worcester, Mass., where he was research engineer. He has not announced his plans for the future.

At the annual meeting of the National Safety Congress held in Detroit recently, B. F. Tillson, assistant superintendent of the New Jersey Zinc Company, Franklin, N. J., was elected a sectional representative and also a sectional officer in charge of mining.

A. W. Kuebler has been appointed general manager for the Calumet Malleable Iron Co., Chicago. He was previously president of the Expert Tool & Manufacturing Co., also of Chicago.

Frank R. L. Daley has been appointed experimental and electrical engineer for the New England Pressed Steel Company, Natick, Mass. He was previously chief inspector of the Northway Motors Corporation, also of Natick.

Claire L. Barnes, formerly president of the Merchants Underwriting Corporation, New York City, has become associated with the William H. Rankin Company, Chicago.

L. A. Emerson, who was formerly head of the automotive department of the Dunwoody Institute, Minneapolis, is now supervisor of vocational education at the Joliet Township High School and Junior College, Joliet, Ill.

Lowell H. Grisell is doing detail layout work with the Durant Motors, Inc., Muncie, Ind.

With the Engineers

Elbridge F. Bacon has been appointed junior aeronautical engineer in the air service at McCook Field, Dayton, O. He formerly attended the University of Michigan, Ann Arbor, Mich.

James K. Speer, who was formerly designing engineer for the Gearless Motors Corporation of Pittsburgh, has become sales manager for J. M. Speer & Co., Wilkensburg, Pa.

Don S. Devor, who was formerly associated with the Willys Corporation, Elizabeth, N. J., has been made general manufacturing manager of the Timken Detroit Axle Co., Detroit.

C. Dickerson has joined the experimental department of the Falls Motor Corporation, Sheboygan Falls, Wis. He was formerly assistant in mechanical engineering in Purdue University, West Lafayette, Ind.

Francis L. Atwood, vice president of the Midwest Engine Company, Indianapolis, on Oct. 1 became general manager of the Hill pump plant of the Midwest company at Anderson, Ind.

Edward F. Dickieson, Jr., has been appointed sales engineer, performing the duties of engineer and designer of product and process and salesman to automotive manufacturers, for the Pennsylvania Piston Ring Co., Cleveland.

Cecil T. Spriggs has been appointed instructor in mechanical engineering at the Rensselaer Polytechnic Institute, Troy, N. Y.

Daniel C. Teetor, general manager of the Teetor Manufacturing Company, Indianapolis, now holds the same office with the General Piston Ring Company of the same place, which is the new name of the Teetor company.

Robert S. Drummond has been elected vice president of the Gear Grinding Machine Company, Detroit. He formerly held a similar office with the American Pressweld Radiator Corporation, also of Detroit.

C. A. Obermaier is engaged in designing mining machinery for the Celite Products Company, Lompoc, Cal. He was formerly chief engineer and production manager for the Southern Motors Association, Ltd., Houston, Tex., and more recently associated with the California Uradia Sales Company, Los Angeles.

William R. Strickland has joined the engineering department of the Cadillac Motor Car Company, Detroit. He was formerly associated with the General Motors Research Corporation, Dayton, O.

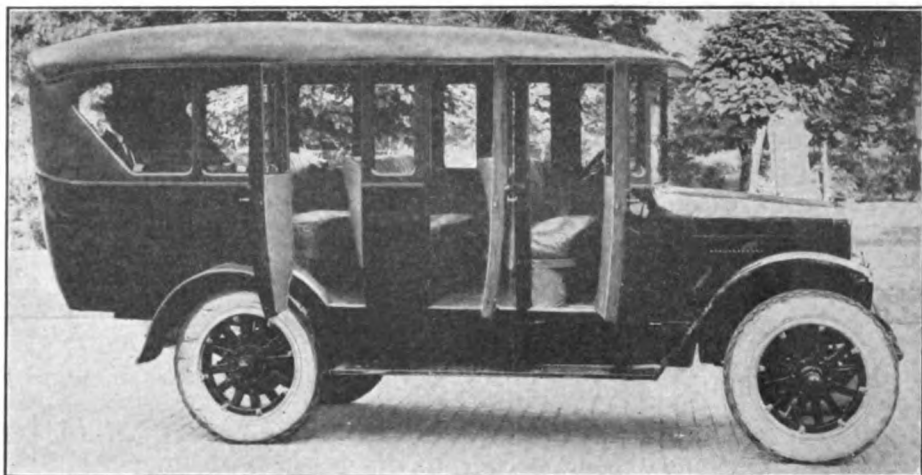
Arthur L. Thurston has been elected president of the Bee Line Aircraft Corporation, Hammondsport, N. Y. He formerly held a similar office with the Aerial Engineering Corporation, Garden City, N. Y.

William M. Wallace, formerly chief draftsman in the bureau of construction and repair, Navy Department, City of Washington, has been appointed consulting engineer for the Piston Research Corporation, Norfolk, Va.

Roy M. Robbins has severed his connection with the Comet Auto Company, Decatur, Ill., where he was mechanical automobile draftsman. He has not announced his plans for the future.

International Speed Sedan

IN THE transportation of passengers to clubs, hotels and summer resorts a very high grade of vehicle is essential. The ordinary bus designed particularly for capacity, and in its ordinary work wholly efficient, in this case doesn't quite fill the bill. Something which in appointments provided approaches the ordinary private owned quality car is demanded. For this purpose, therefore, the International Harvester Company has recently introduced a veritable deluxe bus, the International Model S Speed Sedan.



This International Speed Sedan Not Only Possesses Unusually Easy Riding Qualities, but Is Capable of Making 30 Miles an Hour.

THE top of this new speed sedan is of high-grade, art craft, standard car construction. The interior of both top and body are attractively finished. The seats are wide and deep cushioned. Fourteen to 15 passengers may be comfortably seated in the cross seats from which they can obtain unobstructed view of the passing roadside. Entrance is obtained through three

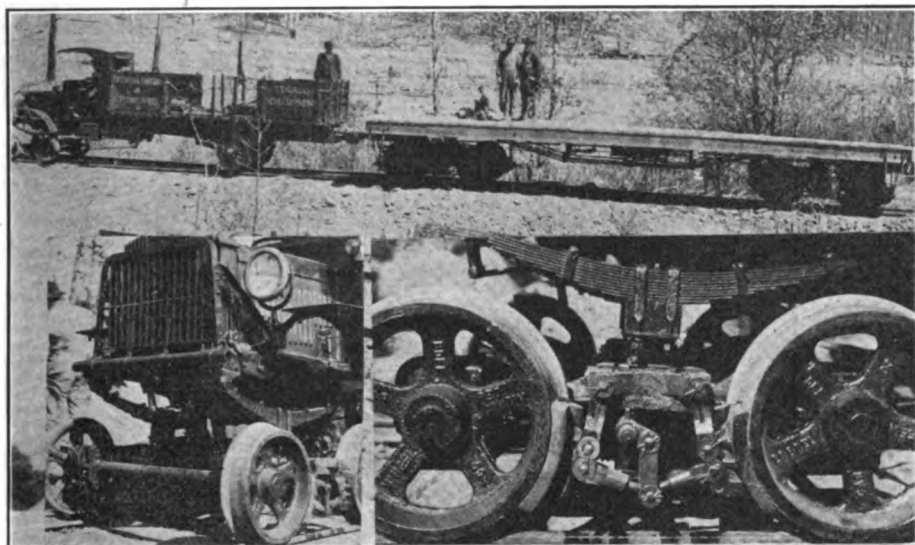
good sized side doors, while passage at end of the third seat gives easy access to the rear without disturbing other passengers.

Speed and at the same time durability, of course, are first requirements of a deluxe bus such as above described, and it is natural, therefore, that the well tried Model S speed chassis should be made a part

of it. It combines the sturdiness and endurance of the heavy duty bus with the flexibility and speed of the touring car.

With the Model S chassis speeds of 25 to 30 miles an hour can be attained. The length of chassis overall is 181½ inches. Heavy pneumatic truck cord tires are a part of the regular equipment.

SELDEN RAILROAD TRUCK A SUCCESS



Motor Trucks, More and More, Are Being Used to Handle Work That Was Formerly Done by Rail Outfits. This Grouping Shows Manner in Which Georgia Railway and Power Construction Job Is Being Taken Care of by Selden "Rail Truck."

THE Georgia Railroad & Power Company is now working on the fourth of their great hydro-electric developments. This is the Tugalo river dam and power plant, which will when completed, add 43 per

cent. to their hydro-electric output—88,000 additional horsepower.

The building of this enormous dam requires two years, and 1000 men with their families were moved to the site. This forms quite a vil-

lage on the banks of the Tugalo river and this village and dam site is situated about 12 miles from the main line of the Southern railroad.

This distance is covered by a standard gauge railroad on which is operated a Selden railroad truck.

This Selden is a Unit 70 equipped with cab and stake and rack body. The front of the truck is mounted on a four-wheel pivotal pony truck. The rear wheels are regular wooden truck wheels fitted with steel locomotive tires. The steering gear of the truck is connected to the hand brake rigging, which acts on the front wheels. Thus the foot brake functions on the rear wheels while the steering wheel applies the special brake on the front pony trucks.

The truck pulls regular freight cars, flat cars equipped with seats to carry passengers and any freight that is to go to the Tugalo dam. The track works its way through a very beautiful section of the country.

MOUNT BYERS CRANE ON MOTOR TRUCK

A BIG forward step in "taking the crane to the job" has been made by the Byers Machine Company of Ravenna, O., in bringing out a crane that can be mounted permanently on a motor truck.

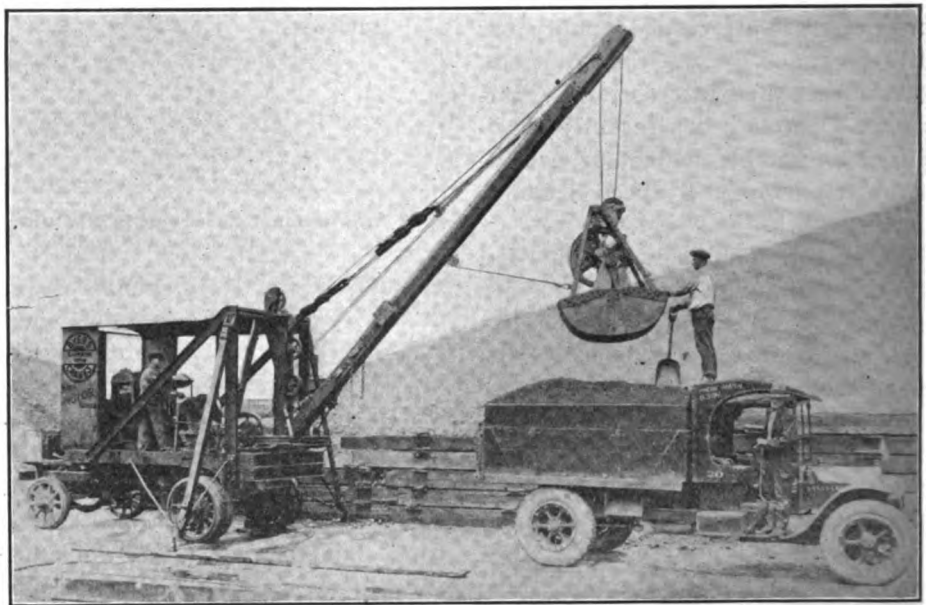
The new outfit, called the "Byers Truckrane," can be driven from the garage to the job every morning just like any motor truck, or driven from one job to another with a minimum of time lost in travel.

In addition, its increased "movability," together with the strength and comparative lightness of the unit, open a new field of crane service. Owners whose work has hitherto been too limited to operate a large crane, can, it is believed, use a machine of the "Truckrane" type at a profit. It should prove an ideal piece of equipment for general contractors, material and supply dealers, counties, municipalities and industrial plants.

THE crane, unmounted, weighs only six tons, and is similar to the well known Byers Auto-Crane model "I" in every respect, except that it has no wheels, jack shaft, nor differential and drive chains. It has a power drum for raising and lowering the boom which is of steel.

The crane is furnished with a Hercules four-cylinder engine developing over 30 horsepower, to be operated with gasoline power. Any half cubic yard bucket weighing not over 2000 pounds can be used with it.

It is not at all necessary to use a new truck for the mounting. One that has seen 90 per cent. of its usefulness, having an engine that is capable of turning over, is all that is needed. Bargains in half-worn out motor trucks can be had everywhere, making the first cost of a complete outfit extremely reasonable.



This Combination of Crane and Truck Has Been Heartily Approved by Road Builders Who State That It Is a Time and Labor Saver.

The "Truckrane" shown is owned and operated by the Worth Motor Service Company of Chicago.

The Byers company has already started the erection of additional

buildings and machinery required to manufacture the "Truckrane" on a large production basis without any interference with their standard line products.

Backmeier Adopts Novel Sales Promotion Plan



The Automobile Pictured Is the First of a Fleet to Be Operated by the Backmeier Sales Corporation; the Machine Has a Special Built Body and Will Be Used in Advertising the Products of the Concern Represented by This Progressive Agency.

THE Backmeier Sales Corporation, 511-12 Lyric Building, Cincinnati, O., has recently outlined one of the most novel missionary programs ever attempted by any manufacturer's representative.

They have just recently started their first advertising automobile, the first of a proposed fleet, into their territory in the interest of the lines they are now handling. This automobile has a special built body and will be used in advertising the products of the concerns represented by the Backmeier Sales Corporation.

The duties of the missionary car are of a strictly promotional nature, states the company.

Standard Announces New Bus

EMBODYING several new features and especially designed and fitted for motor bus work, the new Standard motor bus, just announced by the Standard Motor Truck Company, offers another exceptionally efficient unit of transportation in the bus field.

By combining a long wheelbase with exceptionally long and flexible springs perfect riding qualities are said to have been given the chassis, as well as a balance which makes for uniform easy riding, regardless of the passenger load. The body, which is extremely roomy for its capacity, overhangs the frame but slightly. Bouncing, sideway and whipping, which are occasionally encountered in certain types of buses, are stated to be overcome by the long wheelbase and the fact that so little of the frame overhangs the rear axle.

The manufacturer states that the power plant is more than ample for a good road speed and also to furnish pulling power for bad grades and unimproved roads.

Specifications of the Standard Model "AK" bus chassis are as follows:

Engine—Continental Model L-4, four-cylinder, L head, three-point suspension. Displacement 350 cubic inches (5733 cu. mm.). Horsepower S. A. E. rating, 32.4. Brake horsepower, 39 at 1000 revolutions per minute, 48 at 1400 revolutions per minute.

Lubrication—Full pressure feed oiling system. A gear type automatic primed oil pump supplies oil under pressure from 10 to 40 pounds.

Cylinders—Cast in two pairs of two cylinders each from special cylinder iron. Cylinder heads are removable.

Crankshaft—Three bearings, 2½ inches in diameter and heavily reinforced for perfect running.

Starter—Flywheel housing accommodates Bosch starter, which operates with Bendix shaft through teeth in flywheel.

Ignition—Elsemann magneto, Model G-4, second edition.

Carburetor—Stromberg, 1¼ inches S. A. E. flange dimension.

Governor—Simplex, engine driven.

Water Pump—Centrifugal water pump of special design.

Radiator—Long vertical tube type with cast tanks. Capacity of system, 30 quarts.

Clutch—Brown Lipe, Model 50, in unit with the motor. The clutch consists of six sets of dry discs with alternate discs faced with an asbestos composition friction material. Pressure is applied to the discs by heavy coil springs of proper length to compensate for all wear. No adjustment is necessary.

Transmission—Brown-Lipe, Model 50, four speed and reverse, selective sliding gear type located amidship, supported in chassis at three points to two cross members.

Propeller Shaft and Universal Joints—Spicer front joints are 428 and 431 series. Front shaft, tubular 1½ inches diameter, 134 inch wall. Rear joints, 528 and 531 series. Rear shaft, tubular 2¼ inches diameter, 134 inch wall.

Front Axle—Timken, special bus type. Wheel track, 68; spring centers, 35; road clearance, 8½ inches.

Rear Axle—Timken special bus type, worm drive, full floating type. Wheel track, 72 inches; spring centers, 50 inches. Road clearance, 6½ inches. Worm and wheel reduction, 8.5 to one. Brake, 21 inches diameter.

Service and Emergency Brakes—In the rear wheels. Duplex type internal expanding. Shoes faced woven asbestos and wire fabric.

Wheels—Sewell cushion wheels, 36x5 front and 36x5 dual in the rear. Tires, semi-pneumatic.

Springs—Semi-elliptic, both front and rear of electric furnace steel. Front, 46 inches long by three inches wide; rear, 55 inches long by three inches wide.

Drive—The drive thrust from the rear axle is transmitted to the chassis through radius rods of heavy construction with swivel eye at front end to relieve the

twisting. Torque reaction from the axle is taken by the rear springs which cushion the shock loads due to sudden starting and braking.

Frame—Seven-inch pressed steel, ¼ inch thick with 2½ inch flange. Kick-up over rear axle.

Steering Gear—Gemmer Model R, worm and wheel type, located on left hand side. Hand wheel, 20 inches diameter. Hand control for spark and throttle just under the hand wheel.

Body—General Dimensions—Length over all, 24 feet six inches; length over body, 20 feet three inches; over all width, seven feet two inches; length of operator's vestibule, 3 feet six inches; width of door opening, two feet six inches; width of seats, 31 inches; width of aisle 16 inches; height from floor to top of roof, six feet five inches; height from floor to window rest, 28 inches; seat spacing, 27 inches; seat capacity without operation, 28 inches; ground to step, 16 inches; step to floor of body, 16 inches.

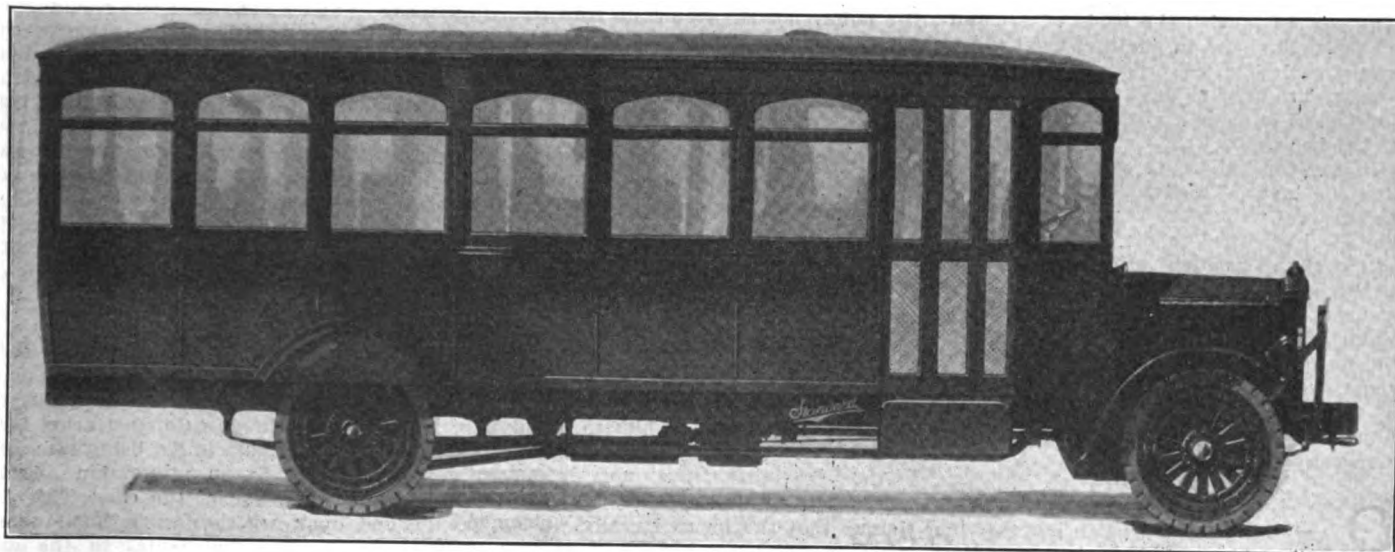
Douglas L. Arnold has severed his connection with the International Harvester Corporation, Chicago, where he held the position of chief engineer of special engineering. His plans for the future have not been announced as yet.

J. R. VanDyke is no longer connected with the United States Ball Bearing Manufacturing Company, Chicago, but is associated with the department of engineering mathematics, University of Colorado, Boulder.

F. A. Cornell has become sales manager of the C. G. Spring Company, Kalamazoo, Mich. He was formerly manager of the Perfection Spring Service Company, Cleveland, and more recently manager of the Omaha branch of the Studebaker Corporation, South Bend, Ind.

Harry A. Oswald, who was formerly manager of manufacturers' sales for the Truscon Laboratory, Detroit, is now associated with the Hayes-Ionia Body Company, Grand Rapids, Mich.

Stewart McDonald, president of the Moon Motor Car Company, St. Louis, has been elected a director of the St. Louis Chamber of Commerce.



By Combining a Long Wheelbase with Exceptionally Long, Flexible Springs, Standard Motor Truck Company Has Imparted Unusually Easy Riding Qualities to Its Newest Product, Besides Eliminating Sideway and Bouncing.

LEGAL POINTS

By SAMUEL WANT

THE practise of arranging with insurance agents to "cover" an automobile by a verbal instruction has elements of danger, as pointed out in a recent California decision. In this case the car was destroyed by fire after the motorist had instructed his agent to "cover" it, which the latter agreed to do, effective immediately. But the loss occurred before the policy was actually issued, and the company refused to pay the insurance.

Its position was based upon a clause in its contract with the agent that policies will be written only at the home office, and the court sustained its contention that under this provision no liability could attach to the insurance company unless it indicated its acceptance of the risk by actually issuing the policy, or otherwise confirming the act of its authorized agent.

IN ANOTHER case the motorist directed his agent to issue a policy covering all risks of loss. By mistake only fire risk was covered by the policy actually issued. This error was discovered by both the agent and the insured, and both intended to correct it, but neither took any affirmative action to that end.

The car was damaged in a collision and the insurance company voluntarily paid a small amount for damage done in a fire that ensued from the collision, but refused to pay anything for such damage as was solely attributable to the contact of the car with the other vehicle. Its position on this point was upheld by the court.

MOST automobile insurance policies contain a provision to the effect that the insured must give immediate notice in the event of an accident which is to furnish the basis of a claim on the policy, and in addition must file a sworn and detailed proof of the actual loss within 30 or 60 days. Failure to file such proof is made a ground of forfeiture of the insurance.

In a recent Missouri case it appeared that the insured tendered his sworn and detail proof within the required time, but that he had failed to file any immediate notice of the accident prior to the filing of the proof of loss. On this ground the insurance company refused to pay the claim, but in the resulting suit filed by the insured a verdict was recovered. The court held that the forfeiture provision of the policy applied exclusively to the filing of the formal proofs of loss as shown by the testimony.

ONE recent decision arises over the very unusual fact of an increase in the value of a car between the date of the issuance of a policy on it and the date of the loss of the car by fire.

The policy was issued in 1915 and the loss occurred in 1919, while the suit was reached for trial only a few months ago.

The value of the car as given in the policy was \$250, while the actual value at the time of the loss was shown to be \$400. The insurance company was unwilling to pay the larger amount and in the suit filed by the insured the court decided that if the increase in value occurred after the last renewal of the policy the insured was entitled to the larger amount; otherwise he could not claim more than the value stated in the policy.

POLICIES covering loss by fire usually contain a provision exempting the company from liability if the fire originates within the automobile.

In a recent New York case involving such a policy it appeared that the car ran into a ditch, as a result of which gasoline leaked from the tank, the vapor penetrated to the headlight and an explosion occurred. The car was totally destroyed in the fire that was thus started. The court decided that under these facts the insurance company could not be compelled to pay the loss.

A NUMBER of recent court controversies have arisen over the failure of motor car owners to appreciate the importance of obtaining a transfer of the insurance coincident with the transfer of a car. Automobile policies expressly provide that the insurance becomes absolutely void when the car is transferred, and of course this provision is legally binding.

In some of the cases it was shown that the local agent who issued the policy had full knowledge of the subsequent transfer of the car, and neither cancelled the policy nor suggested its transfer. In such instances it has been decided in some states that the new owner of the car can claim indemnity under the policy.

IT IS thoroughly established in insurance law that an insurance company cannot refuse to pay a loss simply because it was due to the negligence of the insured. In individual cases this proves a rule of doubtful soundness, since it enables the owner of a car to literally promote a loss—particularly a fire loss—by refraining from removing the car from a present or impending certainty of loss, when a reasonable amount of effort would enable him to avoid the loss.

And the cases are not infrequent where it is a fair inference from the testimony that the insured really welcomed the loss and by lack of interest to preserve his car contributed to it. But even in such instances the courts do not seem

inclined to extend any special consideration to the insurance companies.

In a recent Texas case, for example, it appeared that a car was in the path of a threatened conflagration and that ordinary prudence suggested its removal. The insured took no action, however. When the car was destroyed the insurance company refused to pay, but in the suit filed by the insured a verdict was obtained by him.

Of course the facts of a given cause may amount to a willful or substantially willful infliction of the loss by the insured. In such instances the courts would not hesitate to decide in favor of the insurance companies.

IN AN Illinois case, involving the same principle of law, a man was riding as a passenger in a taxicab. When crossing railroad tracks the car was struck by an engine. The passenger was killed and it was clear that the accident was due to the combined negligence of the taxi driver and of the engineer. The court held that the relatives of the deceased were entitled to damages from the railroad company.

IN A Washington case the evidence showed that a bride and groom and others riding in an automobile on their way to the wedding place witnessed a collision between plaintiff's motorcycle and defendant's truck. The bride described the accident with seeming accuracy and much detail. The court rejected her entire testimony because "she was on her way to her wedding with the gentleman whom she was to wed, approaching the house of the minister, and it was not thought she would observe so accurately as she testified concerning the motorcycle and truck; that she would have been absorbed by the attention of the gentleman at her side." But the Supreme Court disagreed with this estimate of the value of her testimony, interpolating that it is the lady's second marriage, and "because the witness testified that she was concerned about the traffic because of the nervousness of her prospective husband, and was therefore observing traffic on the street, and was concerned with whether the truck would cross ahead of them or not."

THE question in a recent New York case was whether a chauffeur on a milk truck could obtain damages under the Workmen's Compensation Law for the injuries due to his being attacked in the street in an altercation arising from his operation of the car. This depended upon whether, in a legal sense the injury was "incidental to the employment." The court decided in the affirmative.

A CASE just decided in Iowa emphasizes the legal rule that a motorist must take reasonable precautions to avoid accident before entering upon railroad tracks at a public crossing, irrespective of the legal duty of passing trains to give warning of their approach. In this case, involving a collision between an automobile and a steam engine, the driver of the car insisted that she had carefully looked up and down the track before attempting to cross. There was evidence that the engine was proceeding at a high speed and that it had failed to give the required warnings as it approached the crossing. But a consideration of the surroundings of the crossing convinced the court that if the motorist had in fact taken the precaution to look up the tracks, there was no reason why she should not have seen the approaching train. For this reason the court decided that the motorist was not entitled to damages from the railroad company, notwithstanding its negligence.

IN A New Jersey case the court reversed a judgment for damages against a motorist because the jury had been instructed that the motorist's failure to look both to the right and left before driving across an intersecting street constituted legal negligence, rendering the motorist liable for a collision with a car coming from the intersecting street. The court points out that it is the duty of the driver of a car to look to the left and right for approaching vehicles before crossing an intersecting street, but that his failure to do so only creates a question of fact for the jury as to whether this was the actual cause of the accident. Unless the jury so find, under all the facts in the case, the violation of the rule in questioning has no legal effect.

A similar question was presented in a recent New York case, with the same result. In the New Jersey case the court stated that the determination of the cause of the accident must be made upon the principle that the rights of everyone on the public streets are equal, and the obligations mutual, regardless of the situation of respective cars or pedestrians. In the New York case the court gives expression to the same principle by declaring that "the supreme rule of the road under all contingencies is the rule of mutual forbearance."

THE single question presented to the Court of Errors and Appeals of New Jersey in a recent case was whether or not the evidence was so clear and conclusive as to warrant the trial court in directing a verdict for defendant on the ground of contributory negligence of plaintiff. He was a boy of 16 years of age and was riding a bicycle along a public road accompanied by four companions. They were riding at a distance of from 12 to 20 feet behind defendant's motor delivery truck, which had passed them on the road. They were all traveling fast, and while going down a long incline they approached six or seven touring cars coming rapidly from

the opposite direction. There was also a farm wagon standing across the road in front of them which the truck driver attempted to pass around, but on finding that he could not do so with safety, he, without warning, put on his brakes quickly and came to a full stop. Three of the bicyclists, in order to avoid a collision with the truck, turned to the right and piled upon one another in a ditch alongside the road. The plaintiff, in order to avoid the same fate, turned to the left and was struck by one of the automobiles coming from the other direction and very seriously injured.

The trial court refused to direct a verdict for the truck owner and its judgment was affirmed. The court said: "The plaintiff had a right to assume that the truck driver was using reasonable care to observe the condition of the traffic ahead, and would so operate and regulate the speed of the truck as not to endanger those who were driving or riding in his rear and whose view up the road and of the approach of vehicles were shut off by the truck, and that the driver would use reasonable care to give timely and ample warning of any danger ahead so as to afford them an opportunity to halt their bicycles in time to avoid running into the truck or at least to turn into a place of safety. That the truck driver failed in his duty in that regard, and thus practically by his negligent conduct lured the plaintiff and his companions into a dangerous situation, appears clearly from the evidence. As a consequence of such negligent conduct the plaintiff and his companions were overtaken by an unforeseen and sudden peril which called upon them, on the instant, in a state of mind more or less distracted by the impending peril, to exercise their best judgment to reach a place of safety with the result that those turning to the right fell on top of one another into a ditch alongside of the road, whereas the plaintiff to avoid the mishap of his companions and to avoid injuring them and himself turned to the left, hugging closely as practicable the side of the truck, only to be met and struck by an approaching automobile which was hidden from his view by the truck. The plaintiff in the circumstances in which he found himself was not bound to exercise an infallible judgment as to what course to take to escape threatening and imminent danger; all that was required of him was to exercise that degree of care for his safety, as an ordinarily prudent person, suddenly overtaken by a peril, in a similar situation, would have taken, and that presented clearly a jury question."

IN ANOTHER recent Connecticut case, involving a claim for the death of a pedestrian who had been struck by an automobile, the principal question in the case was the claim of the motorist that the damages awarded were excessive and that the jury had been influenced to this result by the act of the plaintiff's attorney in bringing out that the motorist was insured against loss, so that the verdict would be paid by an insurance company. Lawyers versed in the psychology of jury practise often resort to this trick, knowing that a jury will

feel less hesitancy in awarding a substantial verdict if they know that the motorist will not be called upon to pay it out of his own pocket. Juries usually have little sympathy, on the other hand, for insurance companies.

In dealing with this issue the court points out that the practise of thus trying to influence a jury's judgment is improper. Nevertheless, the court points out, it is common knowledge that prudent motorists always insure against accident. Hence the jury had not been told anything they did not know before. The lower court had told the jury that this fact should not influence them, and the higher court held that this admonition prevented the point from amounting to an error justifying a reversal of the verdict for the claimant.

On the question of the excessiveness of the verdict the higher court decided that an award of \$10,000 was not unreasonable. The decedent was a woman 25 years of age. She was the mother of two young children, and was in sound health.

"Such problems," the court said, "are peculiarly appropriate for a jury's deliberation in which 12 individual judgments are set to the task of estimation, and the verdict is a composite of the views of the 12. The fairness of the resultant award cannot well be subjected to any recognized test, or measured by any certain standard. * * * Where the matter is submitted to a jury of 12 men to exercise their combined judgment, wide latitude must be accorded to them, and their verdict should not be disturbed for difference in judgment, even if considerable."

IN A New Jersey case involving a suit by a pedestrian for injuries due to the alleged negligence of a motorist the evidence showed that the pedestrian stepped from the sidewalk to the roadway after seeing an approaching car about 300 feet away, and that she did not again look in the direction of the car as she continued across the street. She was struck by the automobile, and her failure to continue to watch out for the car and to keep out of its way was relied upon by the motorist as a defense to her suit. In deciding that the motorist's defense was not sound, the court said:

"She (the pedestrian who was injured) saw the automobile approaching; she perceived that it was 300 feet away as she stepped off the westerly curb; she knew that the roadway was a very narrow one; she had a right to assume that her passage across the street would be observed by the driver of the defendant's car; she knew that he could utilize the full width of the street to avoid running her down, for the evidence showed that there was no obstruction in the street to prevent such free use of it by him. We do not think it can be said as a matter of law that a reasonably prudent person exercising due care for her own safety would not have acted as she did in the situation which was presented to her mind; in other words, that the existence of negligence on her part was a matter for the jury and not for the court to settle, in view of all the facts and presumptions which have been indicated."

Is the Farmer Sold on the Car Truck and Tractor

Is He Gradually Drifting Back to Horse Drawn Equipment or Will He Continue to Be the Salesman's Best Prospect? *Read This Article*—It Will Tell You.

BELIEVING that an analysis of what has been done in the past might be indicative of future trends, and also remembering the speculation of pre-war years relative to the replacement of horses and mules on farms by the automobile, truck and tractor, the Capper Farm Press Bureau of Research have just concluded an intensive analysis of the influence of these three automotive machines on the horse population of the United States.

For the purpose of accurate analysis, the 18 more important agricultural states, in which the 1920 census found 67 per cent. of the total horses and mules and 71 per cent. of the total agricultural wealth, have been taken as a unit for study in the broad analysis.

Kansas, which in 1921 approximately tied Iowa and Illinois among all states in the Union in the total number of horses and mules on farms, was taken for the purpose of intensive analytical study.

THE data developed is little less than astounding to many who have not carefully followed the replacement of horses and mules on farms by the tractor, truck and automobile. Not only has the total number decreased very remarkably, but still more startling is the apparent decrease in breeding stock and of young stock under two years of age on farms.

It seems very apparent that the farmer is sold on the automotive idea; that he expects to continue to utilize his automobile, his truck and tractor; and that he anticipates replacing these three items when their utility is outworn in his hands. In fact, there may be some question if he has not already reached a

not made increases that are at all proportionate with those made by other items of farm products, especially live stock.

This would make it seem evident that the farmer, despite his knowledge of the great decrease in number of horses and mules on farms, did not anticipate a revival of demand for them, but intuitively followed the unexpressed mass feeling that the automotive idea could be expected to make still more rapid advances in the future.

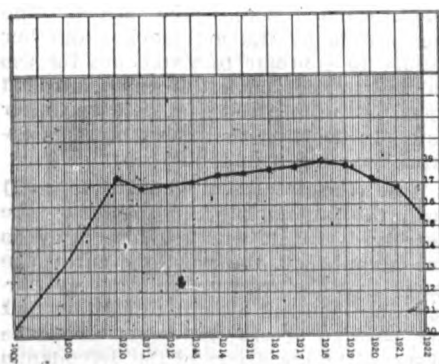
Let us see what the actual situation is. In graph No. 1 is indicated the variations in the number of horses and mules on farms in the 18 more important, typical, agricultural states of the Union. The states are:

Kansas	Oklahoma	N. Dakota
Missouri	Texas	S. Dakota
Nebraska	Arkansas	Wisconsin
Colorado	Michigan	Minnesota
Illinois	Iowa	Pennsylvania
Indiana	Ohio	New Jersey

You will note that the total number of horses and mules increased very rapidly during the period 1900 to 1910, as was in line with the rapid development of agriculture and the increase in total acreage under cultivation. There was a reaction

following this year from which recovery was made in 1912 and 1913. During the years 1914 and 15, at which time agriculture was generally considered quite prosperous, and the threatened European war became an actuality with its natural increase in prices of farm products and demands for horse flesh both for war and other purposes, we find a gradual increase in number of horses and mules on farms until the year of 1918 is reached, at which time a decline set in and the year 1922 finds us with a smaller number of horses and mules on farms in these states than at any time since approximately 1907. This indicates a decrease of considerably more than 1,000,000

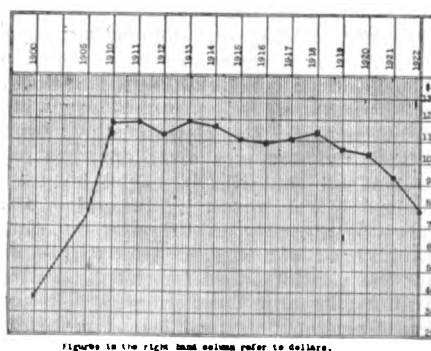
No. 1
NUMBER OF HORSES AND MULES IN THE EIGHTEEN CAPPER STATES
1900-1922



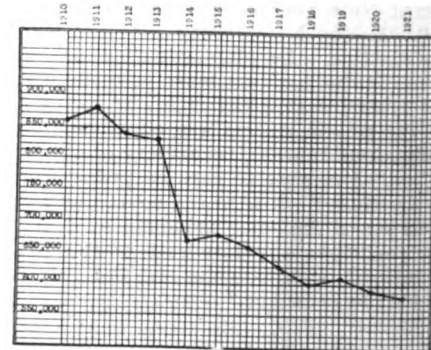
point where this is absolutely essential and the only method by means of which he can maintain his production, business and social activities.

Not only is the total number of horses and mules on farms decreased very remarkably, but somewhat more unusual is the fact that the price of horses and mules is down and has been down for nearly a year, approximately 40 per cent. below the pre-war level of 1910-14 inclusive. While it strengthened somewhat during the latter part of this current year, yet it is still very low and has

No. 2
AVERAGE PRICE PER HEAD OF HORSES AND MULES IN THE UNITED STATES.
1900-1922.



No. 3
INDICATING DECREASE IN WORKING STOCK THREE YEARS OLD AND OVER
IN KANSAS, 1910-1922. (HORSES AND MULES.)

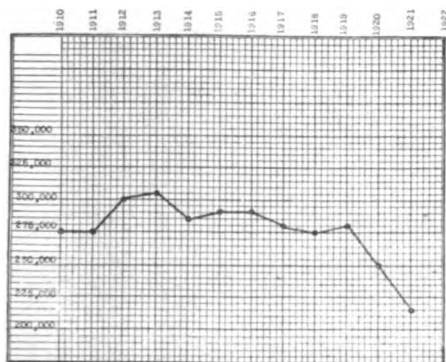


horses and mules in these states. Not a very startling figure perhaps as viewed in the light of all classes of horses and mules.

A more detailed story which would have value in forecasting future tendencies is developed in the analysis of the price factor during this period and also of the variations in numbers of the various classes of young stock, mature stock and breeding stock on farms.

Graph No. 2 indicates the variation in prices of horses and mules. This is the average price per head as quoted by the United States Department of Agriculture for the period 1910 to 1922. The interest-

No. 4.
INDICATING DECREASE IN HORSES AND MULES UNDER TWO YEARS OF AGE
IN KANSAS, 1910-1922.

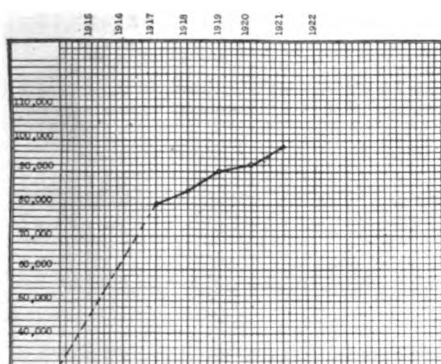


ing features developed here are that the price of horses and mules increased with the same proportionate rapidity prior to 1910, as did the number of horses and mules. Beginning with the war period, however, when agriculture was speeding up and making its greatest efforts, when business as a whole was undertaking more activity than at any time previous in the decade, and the demand for horses and mules for war purposes was making serious inroads upon our supplies, it is interesting to note that the price of horses and mules failed to respond. On the contrary, these prices decreased speedily except for a slight recovery in 1917 and 1918, since which time they have continued to decrease until within the last few months when slight recoveries have been noted.

During this period, 1914-1920, prices of all other types and kinds of farm products and live stock made very outstanding increases, some of them increasing more than 100 per cent. That this did not occur in the case of horses and mules surely has some indication relative to the future.

And these trends are strikingly portrayed by an intimate analysis of horses and mules on farms in the State of Kansas, which virtually ranks as the second horse state in the Union, according to

No. 7.
FARM OWNED AUTOMOBILES IN KANSAS, 1910-1922.



the Department of Agriculture count, 1921.

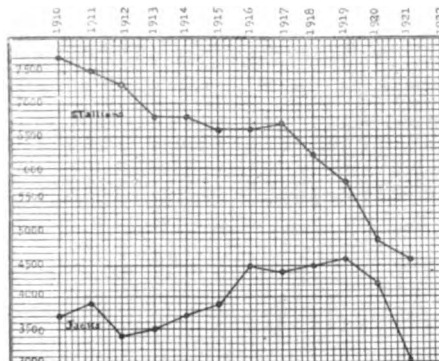
The accompanying graphs tell their own story. They scarcely need discussion.

Graph No. 3 indicates the relative decrease in working stock (horses and mules), three years old and over in Kansas, 1910-1922. A decrease from 870 odd thousand in 1911 to a little more than

570,000 Jan. 1, 1922, is indicated, this being a decrease of more than one-third from the high point of 1911 in total number of work stock three years old and over.

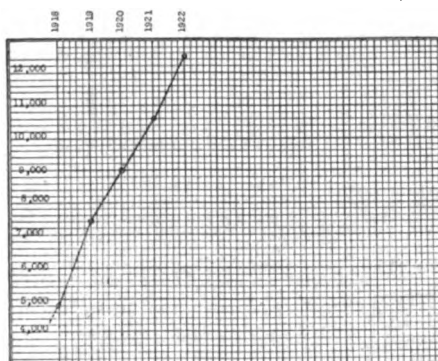
The relative horse and mule population of 1923-24 and 25 is indicated by graph No. 4, which visualizes the de-

No. 5.
RELATIVE DECREASES IN NUMBER OF STALLIONS AND JACKS IN KANSAS, 1910-1922.



crease in horses and mules under two years of age in Kansas for the period 1910-1922. The total number of this young stock decreased from 305,000 in 1913 to 215,000 in 1922. A decrease again of approximately one-third in total number of this class of stock.

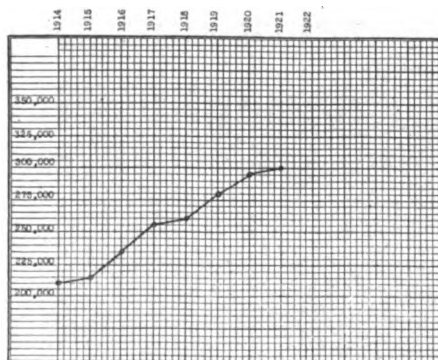
No. 6.
GROWTH OF TRACTORS ON KANSAS FARMS
1910-1922.



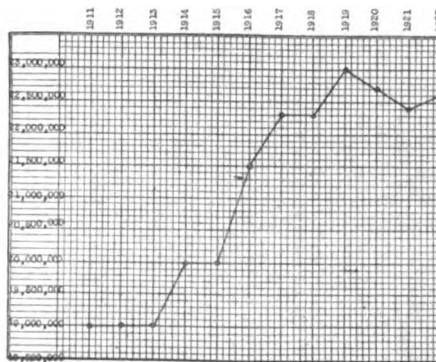
Graph No. 5 indicates with some degree of accuracy the relative horse population which we may expect in the years 1924-25 and future years. In this graph is visualized the relative decreases and increases of stallions and jacks in the State of Kansas for this period.

You will note that the number of stal-

No. 10.
SHOWING INCREASE IN HORSES CLASSIFIED AS "FORES, CRIPPLES, PLUGS,"
IN KANSAS, 1914-1921.



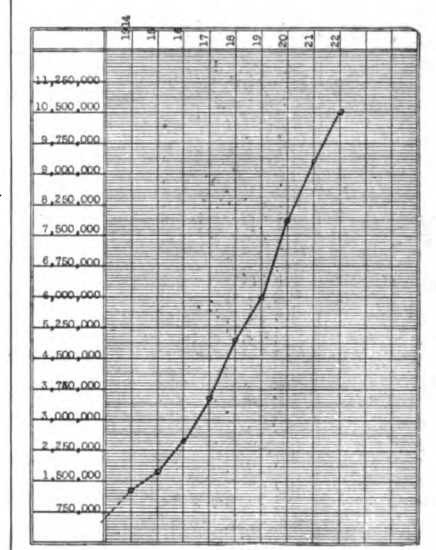
No. 6.
ACREAGE OF ALL KANSAS CROPS ACCORDING TO KANSAS STATE BOARD OF AGRICULTURE,
1911-1921.
1922 ESTIMATE MADE BY KANSAS STATE BOARD.



lions has decreased from 7500 to 4600, a total decrease of 2900, or approximately 38 per cent. Jacks, on the other hand, increased quite rapidly in the period 1910 to 1919; since that time they have decreased to a lower point than they were in 1910. A decrease of 18 per cent. from the year 1910 with a 37 per cent increase from the high point of 1919.

Since the impression might be gained that this startling and unusual loss in total horse population in the State of Kansas has been made in the face of decreased agricultural activity, we present chart No. 6, which indicates graphically the acreage of all crops in the State of Kansas for the period 1911 to 1922, according to the Kansas State Board of Agriculture. 1922 acreage has been projected by the Capper Farm Press Bureau of Research from statistics furnished by the Kansas State Board of Agriculture. It is interesting to note that this curve of crop acreage is diametrically opposed

GROWTH OF AUTOMOBILES IN THE UNITED STATES
1914-1922.



to the curves on horse population which have been presented previously in this discussion.

If then, the farmers of the State of Kansas continued during this period of 1910 to 1922 to continually and constantly increase the total cultivated acreage in that state, by what means have they accomplished it? What has replaced
(Continued on Page 638.)

Mechanical Specifications of Motor Trucks—1922

REVISED EACH MONTH

[illegible][illegible]

TRADE NAME AND MODEL	Capacity, Pounds	Chassis Price	Wheelbase	Frame Material	Make of Engine	ENGINE				GEARSET				Make of Carburetor	Type of Feed	Clutch Type	Type	Location	Speeds	Total Gear Reduction in High	Final Drive	Make of Rear Axle	Type of Rear Axle	RUNNING GEAR				Make	Extra Cost																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																											
						No. Cylinders	Bore and Stroke in Inches	S. A. E. H. P.	Cylinders, How Cast	Width of Piston Rings	Cooling System	Radiator Type	Ignition System Advance											Make of Governor	Type of Feed	Clutch Type	Type			Location	Speeds	Total Gear Reduction in High	Final Drive	Make of Rear Axle	Type of Rear Axle	WHEELS				Tires, Type	Size, Front	Size, Rear																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																														
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TRADE NAME AND MODEL	Capacity, Pounds	Chassis Price	Wheelbase	Frame Material	Make of Engine	No. Cylinders	Bore and Stroke in Inches	S. A. E. H. P.	ENGINE				Make of Governor	Make of Carburetor	Type of Feed	Clutch Type	Type	Location	Speeds	Total Gear Reduction in High	Final Drive	Make of Rear Axle	GEARSET				Type of Rear Axle	RUNNING GEAR				Make	Extra Cost																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																													
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TRADE NAME AND MODEL	Capacity, Pounds	Chassis Price	Wheelbase	Frame Material	Make of Engine	No. Cylinders	Bore and Stroke in Inches	S. A. E. H. P.	ENGINE				Make of Governor	Make of Carburetor	GEARSET			Final Drive	Make of Rear Axle	TIRES			RUNNING GEAR				STARTING & LIGHTING SYSTEM																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																													
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(Mabel Travis Wood.)

Incidentally, this house organ, with its highly informative text matter and its humorous comments on various events sets a pace which puts it in a class by itself, and one that other publications of this nature will be hard pressed to better.

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Traffic Situation in New York Grave Says Police Official

Commissioner Enright Speaking Before Fifth Avenue Association Tells Members That City Must Take Immediate Action to Relieve Congestion.

NEW YORK, Nov. 10.—Police Commissioner Enright speaking at the annual dinner of the Fifth Avenue Association, which has declared its intention of solving the traffic problem on that thoroughfare, said that something must be done at once to provide for the accommodation for the motor vehicle.

"My traffic department," said the commissioner, is "at the end of its rope." The number of these vehicles has increased between 30 and 33 per cent. this year. Who knows what it will be a year hence, with the price of automobiles so low? The number of pedestrians also increases at a rate not realized by the community. They cannot be crowded off the streets. They must be more foot-way for them as well as more road space for vehicles. The problem is especially difficult on narrow Manhattan Island; it is difficult enough in the Bronx, Brooklyn and Queens, because their street plans were drawn long before the unimagined day of the automobile.

"It is only in part a question of traffic regulation. Streets have been converted into non-commercial thoroughfares; one-way streets have been decreed; sidewalks have been narrowed and raised; signal towers built; policemen to halt and direct vehicles at crossings have been multiplied until the force is too

small for the old duties; but congestion grows worse and worse. Particularly on fine days traffic crawls in many districts, comes often to a full stop, to be untangled by patient cooperation between drivers and the police. But everybody knows that the regulations are in themselves inadequate—there must be more roadways, in the air, on the surface, under the surface, and there must be raised or lowered sidewalks in certain parts of the city."

Police Commissioner Enright and

ENGINEERING COURSE AT COLUMBIA UNIVERSITY.

COLUMBIA university in its extension department has started a course in automobile engineering, aiming to give the motorist a working knowledge of the internal combustion engine, according to a report in the New York Times. Frederick H. Dutcher of the School of Engineering will conduct the course.

Deputy Commissioner Harriss, in charge of traffic, both have visited Europe to study conditions in its chief cities, but the ideas brought back by them have not proved very helpful. In London, for instance, relief of congestion is by comparison a simple matter. Commissioner Enright told the Fifth Avenue Association that to obtain more roadway the Sixth avenue elevated should be changed into a thoroughfare for motor vehicles and the rails sunk in a subway for trains; that the same thing should be done along the line of the Second avenue elevated, and that to remedy the intolerable conditions on trucks swarming West street a viaduct 80 feet wide should be erected from the Battery to 59th street. He also made the admirable suggestion that it would be well to appoint a board to plan relief in all the boroughs, with directions to get to work at once before city life is smothered by the automobile. Conditions in at least one district of the Bronx are almost as bad as in the zone of which 42nd street from Seven to Fifth avenue is the center. Trouble, too, is piling up in Brooklyn and Queens.

The Russell Sage Foundation, represented by Nelson P. Lewis, former president of the National City Planning Conference, and Amos Schaeffer, consulting engineer in the borough president's office, have tackled this problem. They, too, have advocated the West street viaduct and the dismantling of elevated roads.

UNITED MOTORS PRODUCTS APPOINTS BEARDSLEY.

GRAND RAPIDS, MICH., Nov. 15.—Velney S. Beardsley has been appointed western district sales manager of the United Motors Products Company, which is actively in production now of the new one-ton speed model, the "Highway Special."

Mr. Beardsley, whose headquarters are in Los Angeles, is one of the best known representatives on the Pacific coast, he having been a pioneer in truck sales and having handled motor trucks exclusively for the past 18 years.

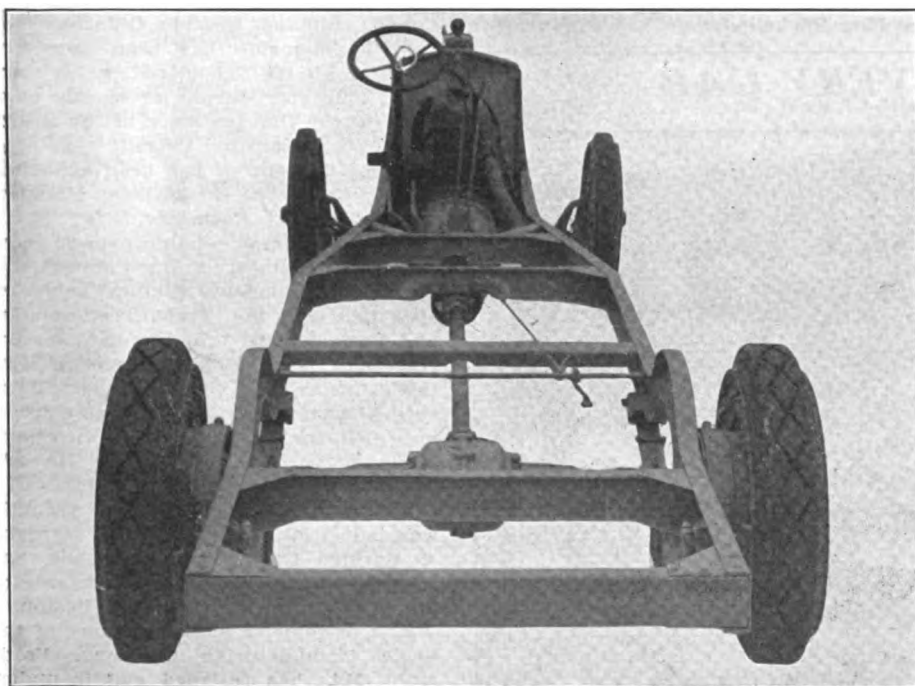
Appointments will be made immediately of dealers in coast cities not already closed, as Mr. Beardsley will act only as the factory representative, controlling no retail outlets himself.

G. R. Wilber, vice president and general manager of the United Motors Products Company, has just made a flying trip through the eastern territory and reports that production of the new "Highway Special" is being pushed beyond the limit anticipated, as orders for sample jobs are being received from every section of the country and some newly appointed dealers have ordered carload shipments from specifications without waiting to see the actual truck.

Expectations based upon a study of the trend in truck buying are being more than realized in the response which has greeted the announcement of the "Highway Special" at its new low price level for an electrically equipped truck chassis, \$895.

France's exports of automobiles in 1921 was 19 per cent. greater than in 1920.

CHASSIS OF NELSON TRUCK



Splendid Design and Rugged Construction Are Features of This Nelson Job, Which Has Given a Good Account of Itself in Heavy Hauling.

Detroit Statistics Show Big Gain in Motor Truck Building

More Than 80 Per Cent. Increase in Manufacture of Commercial Vehicles Since First of Year—Short Haul Freight Business Using Many Units.

(Special to Motor Truck.)

DETROIT, MICH., Nov. 13.—There are 80 per cent. more motor trucks being manufactured now than there were at the beginning of the year according to the most recent figures available. September was an especially good month and October has held to schedule in a very satisfactory way, being nearly 50 per cent. higher than the corresponding period a year ago. While it is now generally conceded that crops are not much larger than common, there is every reason to believe that farmers will receive a good price for their produce and as a result will help to swell total truck sales.

Many dealers report purchases by fleet owners, who announce their belief that business steadily is getting better. There is also a well defined report throughout this section to the effect that motor trucks will sell at a slightly higher price, due to the advance cost of motor truck parts and this undoubtedly has helped to swell the sales total.

CALIFORNIA WILL SET HIGH REGISTRY MARK.

LOS ANGELES, CAL., Nov. 10.—All truck and car registration records for the United States will be broken by California this year, according to a statement issued yesterday by the Los Angeles Chamber of Commerce. Registrations at present total 837,000 for the state, nearly one-third of which are in Los Angeles

county.

The State of New York had registered 812,031 on Jan. 1. The increase of cars registered this year in California is 30 per cent. over last year. This is a greater ratio than that ever achieved by any other state in the Union.

Last year, New York, Ohio and Pennsylvania led California, but the rapid increase of cars in the Pacific coast state indicates that this year it will lead both Ohio and Pennsylvania, with a possibility of passing New York.

The extraordinary increase in the number of autos is attributed to the good roads that form a network over the state, and the climatic conditions that permit pleasurable touring almost every day in the year.

ANDERSON WINS \$500 TRUCK SLOGAN PRIZE.

NEW YORK, Nov. 14.—Selected from over 6000 suggestions in the slogan contest held by the Electric Motor Truck Association, that submitted by J. H. Anderson of 111 Broadway, has been adjudged the winner of the \$500 prize. The winning slogan consisted of seven words, "Use Electric Trucks—Why? Ask All Owners," which brings the rate per word for Mr. Anderson's literary effort to a trifle over \$71.42. Mr. Anderson is connected with the Elbing Weaver Automobile Supply Corporation and his home is at New Rochelle.

The second prize of \$200 went to J. M. Van Harlingen of 175 Fifth avenue, and the third prize, \$100, was won by William B. Nesbitt of 255 West 108th street. In addition to the three major prizes there were four awards of \$5 each.

The contest closed on Oct. 14 and it has taken nearly four weeks for the judges to pass upon the 6000 suggestions that were received. These came from every part of the country. The judges were Robert E. M. Cowie, vice president of the American Railway Express; James H. McGraw, president of the McGraw Hill Publishing Company; John W. Lieb, vice president of the New York Edison Company; Frank W. Smith, president National Electric Light Association, and Arthur Williams, general commercial manager of the New York Edison Company, chairman.

William O. Miller, designer and mechanical draftsman with the Holt Manufacturing Company, Stockton, Cal., has resigned to join the sales force of the San Francisco branch of Fairbanks, Morse & Co., Chicago.

Carroll P. Thweatt has become associated with the Republic Truck Sales Corporation, Alma, Mich. He was previously manager for the Edwards-Thweatt Company, Baltimore.

P. B. Martin has severed his connection with the Automotive Parts Company of Cleveland, O., where he was service manager. His plans for the future have not been announced.

Clarence J. Whitacre has been appointed truck engineer in charge of all commercial designs for the Chevrolet Motor Company, Detroit. He was previously chief engineer for the Samson Tractor Co., Janesville, Wis.

F. H. Pounsett has terminated his engagement as superintendent of mechanical transport, Department of Soldiers Civil Reestablishment, Ottawa, Ontario, and has accepted the position of service representative with Durant Motors of Canada, Limited, Leaside, Ontario.

P. E. Miquelon has been appointed manager for the Schebler-Miquelon Company, Chicago. He was previously manager for the Chicago office of the Zenith Carburetor Company, Detroit.

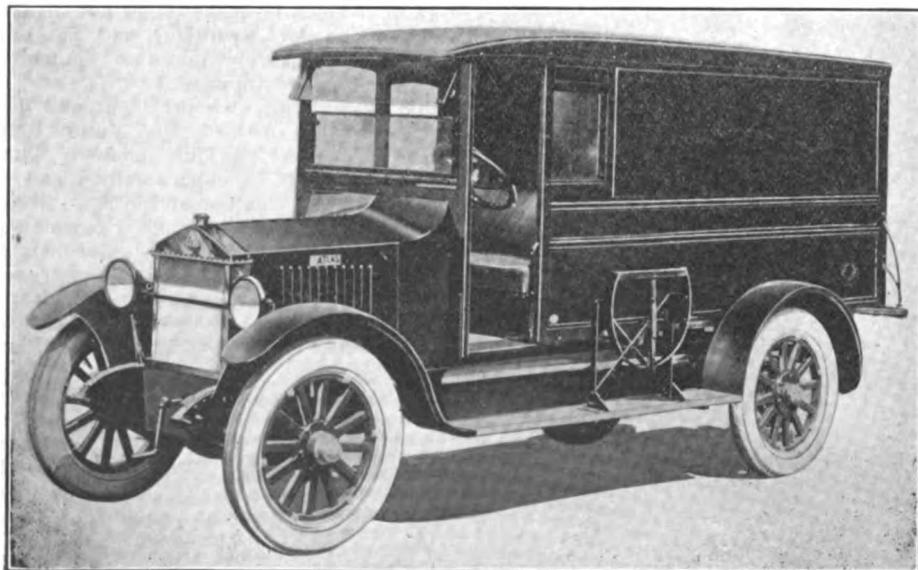
James D. Boucher has been appointed sales manager of the Kellogg Manufacturing Company, Rochester, N. Y.

David Fergusson, who for over 20 years was chief engineer of the Pierce-Arrow Motor Car Company, Buffalo, being responsible for the design, construction and development of the Pierce-Arrow car and truck, severed his connection with this company some time ago, and will devote himself to the practise of consulting engineer in connection with high grade motor cars and trucks. He will continue to be located in Buffalo.

Edgar S. Gorrel, who until recently was industrial engineer for the Nordyke & Marmon Company, Indianapolis, has been elected president and treasurer of the Marmon Boston Company, Boston.

E. E. Richmond, works manager of the Poole Manufacturing Company, Baltimore, Md., has resigned and is undertaking some special development work in Huntington, Mass.

ATLAS DELIVERY CAR



A Popular Unit of the Well-Known Atlas Line of Fine Commercial Vehicles.

General Motors Resumes Dividend on Common Capital Stock

Resumption of Payments Said to Have Been Made Possible by Speedy Recuperation of Automotive Industry from Period of Depression.

DETROIT, MICH., Nov. 14.—The General Motors Corporation recently resumed dividend payments on the 20,550,590 shares of common capital stock of no par value outstanding. Directors at their meeting declared a dividend of 50 cents a share, which in money value will call for a distribution of \$10,275,295, from the company's treasury, out of estimated earnings of \$55,000,000, after all deductions for charges and taxes, for the year 1922. As the dividend is the only one paid by the company this year, a good portion of this year's earnings will be added to surplus account.

Resumption of dividends on the part of this company was made possible by the speedy recuperation of the motor car industry from the depression which prevailed in the trade during the greater part of 1921. The recovery in the motor car industry this year has been extraordinary. Last year, when the demand for cars fell off sharply, much was heard regarding the belief that the industry had reached the saturation point. The record of the industry, however, dispelled this belief, according to leaders in the trade. The year 1922 started with record breaking business in the spring, and the demand for cars continued throughout the year, with the result that the production of high, medium and low priced cars for the current year will establish a new high record in the history of the trade.

In announcing the dividend the company in an official statement pointed out that the disbursement could not be looked upon as a regular quarterly dividend, as the directors were of the opinion that, even though the outlook for the industry was encouraging, consideration of the question of placing the stock on a regular dividend basis was deferred until a later date.

The dividend of 50 cents a share will be distributed among some 50,000 common stockholders of record on the company's books at the present time. In addition to the common stockholders the company reports approximately 20,000 holders of preferred and debenture stock. The corporation which will benefit most from the dividend is E. I. Du Pont de Nemours & Co., Inc., which, through its subsidiaries, is the largest individual holder of the common stock of the General Motors Corporation. The du Pont holdings amount to 7,400,000 shares, so that the cash dividend of this block of stock owned alone amounts to \$3,700,000.

No dividends on General Motors common stock have been paid since the last quarter 1921. In that year the company made payments at the rate of \$1 a share quarterly. On Jan. 4 of this year, when the directors met to take action on the

quarterly dividend covering the first three months of this year, it was decided to suspend dividend payments.

Accompanying the announcement of the dividend, an official statement issued by the company said in part:

"The financial position of the corporation is thoroughly satisfactory. Since the first of the year its indebtedness to banks has been entirely discharged, its liabilities have been reduced by upward of \$45,000,000, and it now has no indebtedness other than for payrolls, supplies, etc. A comparison of balance sheets as of Sept. 30, 1920, and Sept. 30, 1922, shows a reduction of \$110,000,000 in liabilities.

"In the year 1920 the corporation produced on an average about 31,867 cars per month with an investment in inventories equal to about \$5548 per car; the corporation is now producing about 45,000 cars per month (an increase of nearly 50 per cent.) with an investment in inventories equal to about \$2530 per car. In other words, the average investment in inventories per car in 1920 was 2 1/5 times that now required.

"In other respects the corporation has materially fortified its position and the outlook for the year 1923 is considered entirely satisfactory."

The dividend on the common stock is payable Dec. 20 to stockholders of record Nov. 27.

MILK PRODUCERS MEET AT SPRINGFIELD.

SPRINGFIELD, MASS., Nov. 4.—Many distinguished speakers addressed the sixth annual meeting of the National Milk Producers' Federation recently held in this city. The variety of subjects discussed ranged from the cost of milk to political condition in the near East. The New England Milk Producers' Association, which was the host to the convention, made arrangements to handle a crowd of from 2000 to 3000 delegates, and it is estimated that fully this number was in attendance.

Introductory addresses were made by Mayor Edwin F. Leonard of this city; Dr. G. R. Little of Schaghticoke, N. Y., president of the New England Milk Producers' Association, and H. W. Ingersoll of Elyria, O., second vice president of the National Milk Producers' Federation.

Railroad Rates on Dairy Products was discussed by Hon. Milo D. Campbell of Coldwater, Mich., president of the National Milk Producers' Federation; Motor Trucking of Milk by F. W. Fenn of New York City, secretary of the National Auto-



President R. R. Howard of the American Steam Truck Company of Chicago. Mr. Howard is of the Modern School of High Type Executive. He Resigned from the Vice Presidency of the Channell Chemical Company to Join His Present Associates in the Making of This New Steam Truck and Has Just Announced That the Company is Ready for Quantity Production.

mobile Chamber of Commerce; Practical Experiences with Motor Trucking by H. D. Allabach of Philadelphia, Pa., president of the Interstate Milk Producers' Association; I. W. Heeps of Baltimore, Md., treasurer of Maryland State Dairymen's Association, and H. B. Berning of Cincinnati, O., treasurer of Queen City Milk Producers' Association.

MAY BUY MILBURNS ON TIME PAYMENTS.

NEW YORK, Nov. 10.—Announcement of a time payment plan has just been made by the Milburn Wagon Company, manufacturers of Milburn electric trucks, according to the Milburn distributor in this city.

Two plans are offered, under which the buyer can purchase Milburn electric trucks on a part cash and part time basis.

One embraces payments over a 12 months' period, the second, payments over 21 months. Substantially all other details of both plans are the same.

The first payment is made when the order is signed, and amounts to 10 per cent. of the total purchase price; the next payment is made on delivery of the truck, and amounts to 15 per cent. of the purchase price; freight and war tax being paid at this time.

This leaves a balance of 75 per cent., which is divided into equal monthly installments, and is either spread over the 12 or 21 months' period at the option of the buyer.

Interest at six per cent. per annum on unpaid balances is charged, plus an amount varying from \$75 to \$220 to cover the cost of time financing and insurance, the difference being due to size of truck and length of time credit is required.

The Milburn Wagon Company is now manufacturing electric trucks in one ton and one-half ton sizes, especially suited for bakers, laundries and retailers.

Philadelphia Reports Good Truck Demand

Sales Getting Better Say Distributors Who Look for Banner Season Next Year.

(Special to Motor Truck.)

PHILADELPHIA, PA., Nov. 13.—A marked improvement in the demand for motor trucks has been noticeable during the last six weeks in this city, say commercial vehicle dealers, as a result of the improvement in general business conditions. It is particularly noticeable that whereas the demand has usually been more marked for the lighter type of delivery car, the heavier vehicles now are starting to move, several very good sales of this class of equipment being reported.

The used car problem, which has been quite satisfactorily taken care of by passenger car dealers who are working along special lines, may be tried out in connection with sale of motor trucks, it is said, although it is believed that the plan would hardly work as well with the commercial vehicle as it has with the automobile. Notwithstanding this, however, there are several truck dealers who have expressed a willingness to give the plan a try in an endeavor to straighten out a situation which rapidly is becoming grave.

(Signed)

H. SWAIN.

SHORT MEASURERS FINED BY CHICAGO JUDGE.

CHICAGO, ILL., Nov. 10.—During a campaign to do away with short measure of gasoline to motorists in this city it has been necessary to make arrests and several have been fined for having sold short measure.

USE TRUCK WHEN RAILROAD FAILS TO DELIVER.

FLINT, MICH., Nov. 9.—In the recent days of rigid embargoes and acute box car shortage, transportation departments

of the larger manufacturers have been obliged to rely upon other means to keep material coming in and completed cars going out.

When the Buick Motor Car Company found that the rail routes were closed to a shipment of brass ordered from Bristol, Conn., a motor truck was hired to save the production situation.

The trip from Bristol to Flint, a distance of 1009 miles, was made in 84 hours. The load weighed 7½ tons and was driven day and night. The crew consisted of two drivers and a mechanic. "Keep to the schedule at any cost" is the Buick slogan, which accounts for the fact that more than 700 cars has been the average daily production for many weeks.

REYNOLDS SPRING COMPANY DECLARES DIVIDEND.

JACKSON, MICH., Nov. 9.—The board of directors of the Reynolds Spring Company have declared a dividend of 1¾ per cent. on the preferred "A" stock, payable Jan. 1, 1923, to stockholders of record at the close of business on Dec. 18, 1922. Another dividend of 1¾ per cent. on the preferred "B" stock, payable Jan. 1, 1923, to stockholders of record at the close of business on Dec. 18, 1922, is also announced.

GIVE BIG DINNER TO A. C. HARRINGTON.

NEW YORK, Nov. 10.—Packard executives and department heads held a dinner at the Waldorf-Astoria Oct. 13 to celebrate the 20th anniversary of Vice President A. C. Harrington's connection with the Packard Motor Car Company in 1902. His rise to the vice presidency of the New York company came through successive promotions that were earned by unusual success in whatever job was assigned him.

F. P. Steiner is no longer connected with the Detroit Cadillac Motor Car Company of New York as assistant tool designer, but has accepted the position of service manager of the New Rochelle branch of the Watson Stabilator Company of New York.

Complete Truck Trade Recovery Predicted

C. C. Carlton, Secretary Motor Wheel Corporation, Looks for Splendid Business.

LANSING, MICH., Nov. 10.—Complete recovery of the motor truck industry from the tag-end period of post-war depression is predicted for 1923 by C. C. Carlton, secretary of the Motor Wheel Corporation of this city.

"Motor truck manufacturers are preparing, practically without exception, for greatly enlarged production," says Carlton, "conclusive evidence being offered in the form of increased commitments for all classes of material.

"The stabilizing influence of general business revival, restoring confidence among users of truck equipment, and ripening decision to purchase needed trucks and supplies, is creating a demand that will enable the truck industry in 1923 to operate at nearly full capacity.

"The revived demand will be for all classes of trucks, though there will be an especially large market for trucks of the general purpose variety, designed to carry medium loads at comparatively high rates of speed. The utility of this type of truck has been amply demonstrated in countless lines of work, with the result that it is coming more and more into favor.

WHITEHAIR WITH GENERAL MOTORS CORPORATION.

PONTIAC, MICH., Nov. 15.—Harry S. Whitehair has joined the national sales division of General Motors Truck Company, making the third member of the sales force in this division. Headquarters are now maintained at New York and at Chicago and Mr. Whitehair will have general charge of all other territory, while he maintains contact with New York and Chicago. Mr. Whitehair has had unusual experience in national sales work. His joining the GMC organization is the result of the executives' belief that large units of industry are back in the market again, to buy the necessary means to care for expanding business. Substantial individual sales, recently made, show that big buyers are active now.

T. A. Murphy, who was formerly automotive manufacturers' sales representative for Murphy Bros., Chicago, has become sales engineer for the Donahue Steel Products Company, also of that city.

Edwin S. Wheeler, who until recently was assistant manager of the technical department of the International Nickel Company, New York City, has been appointed eastern sales representative with headquarters in New York City, for the Wheeling Bronze Casting Company, Wheeling, W. Va.



If the Shortage of Railroad Freight Cars Continues It May Be a Common Thing to See Sight Like the One Pictured Above.

Speaker at Highways Conference Advocates Unique Plan

President A. J. Brosseau of Mack Trucks, Inc., Says Funds for Building Roads Should Come from Property Tax and Maintenance Be Paid by the Users.

WASHINGTON, Nov. 13.—Making a long step forward in promoting the construction of roads that will do most to serve the country as a whole, the Second National Conference on Education for Highway Engineering and Highway Transport held here last week was attended by more than 350 interested persons, including engineers and representatives of the automotive industry. The part motor transport is to play in the future called for much attention on the part of the professors of more than 50 schools and colleges who in their speeches stressed the fact that well trained men will be needed to direct this work.

President A. J. Brosseau of Mack Trucks, Incorporated, contended that the funds for building roads should come from a tax on property and that maintenance costs should be met by users of the highway and this plan especially appealed to the meeting.

Mr. Brosseau stated that if roads were built and maintained in a scientific manner they would not break down; he also spoke of the careful consideration that should be given to the needs of the community to be served and said that highly expensive materials should not be used unless the traffic especially warranted.

"Cooperation Versus Competition Between Motor Truck and Railroad Transportation" was the subject of a paper read by Vice President W. H. Lyford of the Chicago and Eastern Railroad, who declared that railroads should supplement other service in congested centers by cartage for collection and delivery of freight, and that railroads should abandon unprofitable branch lines to motor trucks which could be operated by the railroads.

Several committees appointed to consider various phases of highway and highway transport engineering education will give their final reports in the near future.

Motor vehicles, especially motor trucks, will play an increasingly important part in the affairs of the nation during the coming years was the consensus of opinion.

SHULER AXLE REORGANIZATION COMPLETE.

LOUISVILLE, KY., Nov. 10.—After several months of careful reorganization the Shuler Axle Company, Incorporated, is again in active operation. The refinancing programme has been completed and ample cash resources are available to insure the continued growth and development of the company.

The official personnel of the Shuler Axle Company has been rounded out by the appointment of W. E. Dugan as vice president and general manager, and the reappointment of F. A. Shuler as director of engineering and manufacturing. These two officials will have active charge of the manufacturing and sales policies of the company. The Shuler factory is rapidly being placed in full production on a complete line of front axles for motor coaches, trucks, tractors and trailers.

Mr. Dugan, the new vice president and general manager, is well known in the automotive industry. Previous to accepting the appointment as a Shuler Axle Company executive, Mr. Dugan was manager of the Cincinnati Axle Plant of the Standard Parts Company. During his 18 years' experience in the industry he has served also as factory manager for the United States Motor Truck Company and for the Selden Motor Vehicle Company.

Frank A. Shuler, who resumes the portfolio of director of engineering and manufacturing with the reorganized company, is one of the most widely known axle men in the country. Before he started the original Shuler Axle Manufacturing several years ago, Mr. Shuler

had been associated with the Timken organization almost without interruption since its beginning. He is regarded as one of the industry's real experts in axle designing and the different phases of manufacturing.

The Shuler Axle Company is building front axles exclusively. A prominent feature of the line is the Shuler wheel brake, a mechanism permitting simultaneous braking on all four wheels. Patents on this device were granted during the past summer.

PHILADELPHIA MOTOR TRUCK ASS'N. MEETS.

PHILADELPHIA, PA., Nov. 14.—The Motor Truck Association of this city held a "Night in Bohemia" at the Adelphia Hotel which was attended by nearly every member.

Considerable business was taken up, a dinner was served and a vaudeville show was provided by A. R. Vittong. President Quirk presided at the meeting.

CHARLES H. WOODRUFF DIES IN DAYTON.

CINCINNATI, O., Nov. 10.—Charles H. Woodruff, sales manager for O. Armleder Company, builder of a well known line of motor trucks, died suddenly from an attack of acute indigestion while on a visit to Dayton.

Mr. Woodruff, a well known figure in the business world, was held in very high esteem by the officials of the company and its employees, all of whom greatly deplore his passing.

DICK HORN WITH BEAR TRACTORS, INC.

PORTLAND, ORE., Nov. 6.—Richard Horn, formerly with the Cleveland Tractor Company as district sales representative has been appointed district sales manager for Bear Tractors, Incorporated, and has just returned from a visit from the factory.

Mr. Horn believes that this territory offers good prospects for the sale of Bear tractors.

J. G. Murphy has accepted a position as factory manager with the Anderson Motor Company, Rock Hill, S. C. He was formerly vice president and Ohio sales representative of the Kelly Valve Company, Cleveland.

Arthur I. Marcum has accepted the position of chief designer in charge of chassis designs for the Eight Wheel Motor Car Company, San Francisco. He was formerly chief draftsman for the Fageol Motors Company, Oakland.

A. F. Bassett has been appointed assistant sales manager of the motor bearings division of the Hyatt Roller Bearing Company, Detroit. Previous to his appointment to this position he was sales engineer for the Detroit territory of the Hyatt company. He is a graduate of the Sheffield Scientific School at Yale University.

SONNET OF THE SERVICE DEPT.

(With Apologies to Mrs. Browning.)
By GORDON CAMERON,
Director of Republic Service.

How do we serve you? Let us count the ways.

We serve you every morning, noon and night

With three-fold care. For yours and others' plight

We labor manfully, and without praise,

For many acts well done. We reach the day's

Calm close with confidence in things aright;

Next morning brings a challenge to fight,

For one poor piston ring in all the maze

Shipped wrong. The courtesy and promptness used

Forgotten quite, because we made one slip.

We serve you well and quickly, tho' abused

In every way because we failed to ship

One nut. If from mistakes we could be loosed,

'Twould be the gods' own nectar to our lip.—Republic Round Table.

Doherty Advocates Home Rule in Regulating Public Utilities

President of Cities Service Company Suggests Among Other Things That Taxicab Business Should Be Municipally Operated and a Monopoly Created.

DETROIT, MICH., Nov. 16.—Advocates of home rule in the regulation of public utility corporations were denounced here today by Henry L. Doherty, head of Henry L. Doherty & Co., and president of the Cities Service Company, in an address before the National Association of Railway and Utility Commissioners.

"Regulation of public utilities by vesting the power in a state commission," said Mr. Doherty, "has proved a step in advance over regulation either by the Legislature or by city governments. The constructive and progressive public service companies want intelligent regulation, and don't want to be compelled to fool with politics, and they believe this can only be accomplished by state commissions. Intelligence without courage will accomplish but little.

"We are entitled to justice, and this we do not always get. This is generally due to a lack of public understanding, and perhaps we public service men are as much or more to blame for this situation than you men are. A large part of our citizens still think it is the duty of the state commissions to give the public service companies hell instead of justice. Too many of our citizens want service at the lowest cost, regardless of whether it is adequate for the company's needs or not, and yet inadequate rates mean in the long run higher rates."

Mr. Doherty's address put the whole case of the public utility corporation before the convention. He suggested that the taxicab business in many cities should be declared a public utility and a

monopoly created.

"Instead of permitting taxicabs to 'shop' for hauling of passengers, compel them to really give service," he said. In most of our American cities there is an oversupply of taxicabs in congested districts and a perfect vacuum of service in other parts of the city, and especially where, if wanted at all, they are wanted badly, where they are a necessity rather than an extravagance.

"In our highly congested cities like New York I think we should give some thought to whether the delivery of goods and wares should not be treated as a public utility and make a regulated monopoly of this also. This would unquestionably greatly diminish the cost of distribution to the public and would materially lessen the congestion on our city streets. Our street railways could be used to do a large part of this work, especially for what now requires heavy trucking, and frequently the track and equipment could be advantageously used during the night when otherwise there is no service, or a small demand for service."

"A street car with 100 passengers in it blocks traffic much less than 50 taxicabs or private cars with an average of two people each. A street car carrying 20 tons of freight blocks the street much less than 40 delivery wagons carrying even 500 pounds of weight. As for our gas and electric companies, they transmit over or under our streets the equivalent of an enormous amount of fuel without interference with the traffic, without

noise and without wear and tear on the streets. Imagine the confusion that would be added to the very bad congestion that now exists in many of our cities if we were to attempt to displace all of the energy transmitted by our gas and electric companies back to wagons and trucks, and imagine what a relief we would have to the congestion in our cities if all fuel for heating purposes ground pipes and all fuel for lighting purpose transmitted in the form of electricity over or under our streets."

INDIANAPOLIS TO HAVE BIG BUS TERMINAL.

INDIANAPOLIS, IND., Nov. 14.—Indianapolis Motor Bus Terminal Company has been formed and consists of representatives of 10 motor bus companies operating out of this city. The purpose of the organization is to build a new union bus terminal in the spring, as due to the expansion of business the terminal now used is to be vacated at once, larger quarters already having been obtained which the company believes may serve until the new building is completed.

The officers of the terminal company are Oliver P. Lloyd, president; J. F. Fendley, vice president, and Stanley Pitchford, secretary and treasurer. Representatives of all the bus companies are included in the board of directors.

I. M. LEWIS RESIGNS FROM BESSEMER CO.

GROVE CITY, PA., Nov. 15.—The Bessemer Motor Truck Company of this city, one of the best known truck manufacturers in the business, announces the resignation of I. M. Lewis, an executive long identified with the company. Mr. Lewis, whose work has called for considerable commendation, has had unusual experience in merchandising and advertising and while he plans first of all to take a short rest before again entering business, he will in all probability accept a position similar to that which he has held with the local company.

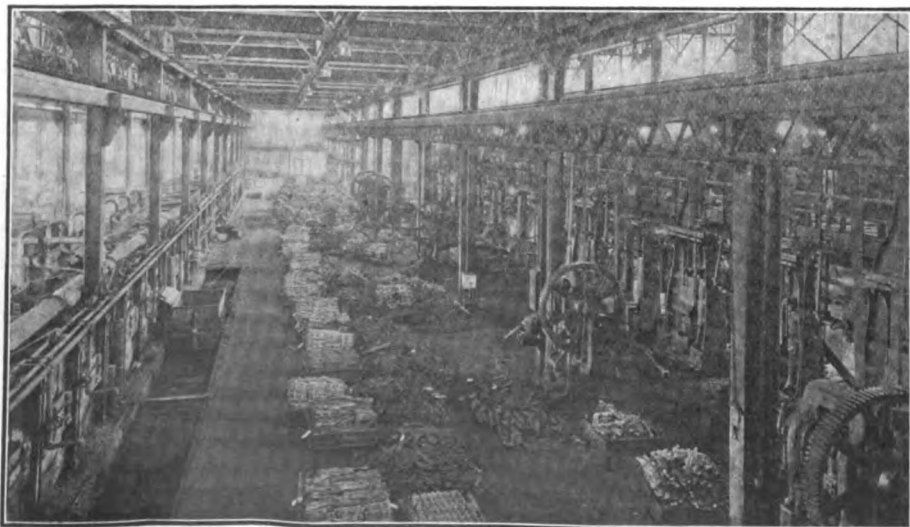
MACK TRUCK EARNINGS SHOW GAIN.

NEW YORK, N. Y., Nov. 10.—Mack Truck, Incorporated, reports net earnings for three months recently ended to be \$1,205,732, as compared with \$12,634 for the same period in 1921, this amount being net earnings with charges, taxes and depreciation already paid. This figure brings net earnings for the year, to date, to \$2,766,564, against \$540,668 for corresponding period last year.

Clarence S. Walker has been engaged as patent counsel for the Wire Wheel Corporation of America, Buffalo.

George H. Hunt, who until recently was sales manager for the Distel Wheel Corporation, Detroit, has been made manager of factory sales for the Beneke & Kropf Manufacturing Company, Chicago.

Where Studebaker Trucks Are Built



Interior of Plant No. Two, Studebaker Company, South Bend, Ind., Conceded to Be One of Best Appointed in Country.

Grand Rapids Scene of Highway Convention

Joint Sessions of Highway Traffic Association and Michigan Body Scheduled for Nov. 21.

GRAND RAPIDS, MICH., Nov. 14.—Interest has been manifested in the joint sessions of the North Central Division of the National Highway Traffic Association and the Michigan State Good Roads Association, which will be held in this city Nov. 21st.

Added importance is given to the meeting as it is stated that every subject included in the very comprehensive programme will come up for consideration by the legislatures of the several middle western states next spring.

Among the better known authorities on highway transportation who will speak are Professor Arthur H. Blanchard, president, National Highway Traffic Association, and professor of Highway Engineering and Highway Transport, University of Michigan; Roy D. Chapin, Michigan director, National Highway Traffic Association, vice president N. A. C. C. and president Hudson Motor Car Company; David C. Fenner, manager, Public Works Department, International Motor Company, New York City; George H. Pride, treasurer, National Highway Traffic Association, and president, Heavy Haulage Company, New York City; R. C. Hargreaves, vice president, North Central Division, National Highway Traffic Association, and president, Hargreaves, Inc., Detroit; David C. Beecroft, vice president, North Atlantic Division, National Highway Traffic Association and directing editor the Class Journal Company, New York City. The programme follows:

Afternoon Session, 2 O'Clock.

Chairman of session, Roy D. Chapin, Michigan director, National Highway Traffic Association.

"Regulations Covering Speeds, Weights and Dimensions of Motor Trucks, Tractors and Trailers," George H. Pride, treasurer, National Highway Traffic Association, and president, Heavy Haulage Company, New York City.

"Regulation of Overloading of Motor Trucks," David C. Fenner, manager, Public Works Department, International Motor Company, New York City.

"Lights for Highway Vehicles: Motor Driven and Horse-Drawn," David C. Beecroft, vice president, North Atlantic Division, National Highway Traffic Association, and directing editor, the Class Journal Company, New York City.

Evening Session, 7:30 O'Clock.

Chairman of session, R. C. Hargreaves, vice president, North Central Division, National Highway Traffic Association, and president, Hargreaves, Inc., Detroit.

"Equitable Distribution of Cost of Construction, Interest on Bonds, Replacements and Maintenance of State Highways," Roy D. Chapin, vice president, National Automobile Chamber of Com-

merce, Inc., and president, Hudson Motor Car Company, Detroit.

"The Economic Value of Highway Transport Franchises," Arthur H. Blanchard, president, National Highway Traffic Association, and professor of Highway Engineering and Highway Transport, University of Michigan.

NEW YORK TRUCK FEE EXPLAINED BY PRATT.

NEW YORK, Nov. 13.—The \$8 a ton fee for commercial vehicles, which figure embraces the combined weight of truck and load, goes into effect on the first of January and has been responsible for raising a problem regarding licensing of tractors and semi-trailers in this state.

Under the present ruling the truck and trailer frequently were registered as two separate vehicles, as in many instances this made the fee no different than as though the two had been registered as one and it was much more convenient to register them in this way, as it admitted of using either one as desired. Under the new ruling the increased fee makes it more expensive to register the truck and trailer as one, a fact which has led T. D. Pratt, general manager, Motor Truck Association of America, to prepare a table setting forth the cost of registration fee, showing the approximate division of waste, the purpose of the table being to show the saving effected by registering both tractor and trailer separately instead of as one vehicle.

H. B. Garman, for seven years superintendent for the Steel Products Company, Cleveland, and for the past four years manager of its Detroit plant, has severed his connection with this company. He has formed the Garman Manufacturing Company, Detroit, for the manufacture of drag links and tie rods in which he has specialized for the past 10 years.

Fine Display of Trucks at Los Angeles Show

Exhibits at Big Exposition Include White, Service, Reo, Autocar and Mack.

LOS ANGELES, CAL., Nov. 13.—The 10th Annual Automobile Show which opened here Saturday and will run a week, while devoted in great part to the exhibition of 1923 models of automobiles, nevertheless shows a fine display of motors, thanks to the truck dealers of Los Angeles who have united to make as complete a showing of the various models handled as possible.

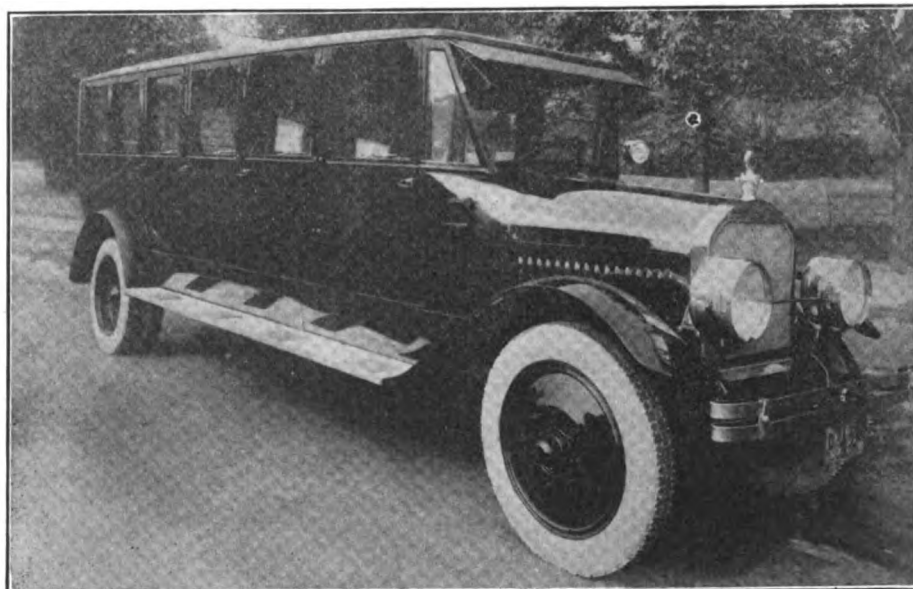
Burt Roberts, executive secretary of the Los Angeles Motor Car Dealers' Association, who is managing the show, states that truck exhibitors include Willys-Overland Pacific Company, White Company, Service Truck Sales Company, Reo Motor Car Company of California, Albertson Motors, Autocar Sales and Service Company, Mack Motors and the Howard Automobile Company.

While no great number of sales have been reported the exhibitors feel positive that 1923 will be a banner year for commercial vehicle sales, this due largely to the reopening of contracts for road building and other construction which have been held up for some time.

James L. Mayer is no longer mechanical engineer for the Tri-State Engineering Company, Zanesville, O., but is associated with the Ernest E. Lee Company, Chicago.

M. H. Wells has engaged in the practice of consulting engineering in Detroit. He was formerly chief engineer for the Detroit Motors, Inc., Trenton, N. J.

Mack Limousine Bus Announced



This Finely Appointed Mack Bus Is Superbly Comfortable and Those Who Have Been Privileged to Ride in It Are Loud in Their Praises.

ACCESSORIES DEPARTMENT

Dall Semi-Steel Replacement Pistons, states the manufacturer, are simply good pistons, made to manufacturers' specifications, sometimes more refined in design and lighter in weight, but always as carefully made and inspected as though they had to pass the most rigid inspection of a motor manufacturer.

Dall pistons are made from the finest semi-steel castings obtainable, molded on special machines by the green sand method of molding which in itself insures



a uniformity in castings, while the 15 per cent. of steel used in the iron mixture insures the fine close grain of metal and the highly polished finished surface of all Dall finished pistons.

In short, when Dall pistons are used in a replacement job, states the manufacturer, it is a guarantee that the job will be as good and in many instances better than the original assembly in the new car.

A stock of many thousand of finished and semi-finished castings is carried at all times to insure prompt delivery. In many cases ordinary orders are shipped



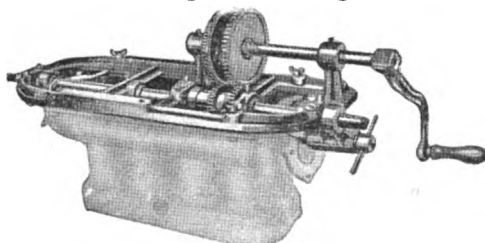
within 24 hours from receipt, while telegraph and special rush orders are filled the same day received.

Excise tax is absorbed by the manufacturers of Dall pistons. All Dall finished pistons are put up in express or parcel post cartons, evenly balanced and labeled, so they can be taken from stock and re-shipped without further packing.

Manufactured by the Dall Motor Parts Co., Vermillion, O.

Hempy-Cooper Bearing Boring Machine Model C-1 for the Ford car is a main bearing boring machine for boring the main bearings in Ford cylinder blocks, all three bearings being bored with one operation in straight alignment, insuring perfect fit of the crankshaft.

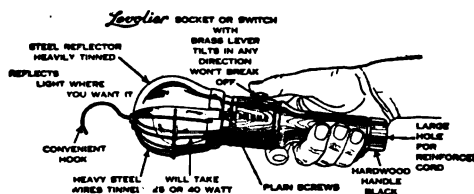
The manufacturer announces that this machine is adjustable to all worn crankshafts and a gauge is furnished with each machine for correctly setting the cutting tools. It frequently has happened that Ford sales and service stations have found it necessary to send out cylinder blocks for rebabbiting and reboring crankshaft



bearings. With this machine there is no necessity for this as when it is used with the rebabbiting jig, also made by the company, a perfectly aligned, highly efficient and wholly dependable job may be turned out. Its use is especially desirable in the smaller communities where not all shops are equipped to handle work of this nature and many owners of these machines report that they have done a good business aside from their regular work in servicing outside jobs.

Manufactured by Hempy-Cooper Manufacturing Company, Kansas City, Mo.

Thumb Switch Portable Guard is designed to give "safe light where and when wanted." In it are found all the essentials for a convenient and serviceable guard, with several new and attractive features.



A thumb switch on the handle makes it a simple matter to turn the current on or off. There is no reaching or stretching for a switch, oftentimes in an inconvenient place—consequently no forgetting and no big light bills.

The reflector is heavily tinned and with the guard is fastened by a Loxon clamp to the wooden handle. The lamp proper is not only guarded from breakage, but cannot rest on inflammable materials to start fires.

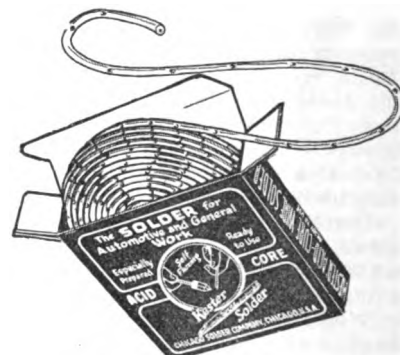
The guard is smaller than those ordinarily used, though it is sufficiently large

to allow sufficient air space between reflector and lamp. This permits the use of Thumb-Switch Lamp Guard in places where ordinary lamp guards won't go. Won't burn the hands.

The Thumb Switch Lamp Guard is small and compact, light in weight and well constructed.

Manufactured by McGill Manufacturing Company, Valparaiso, Ind.

Kester Acid Core Wire Solder is a self-fluxing solder which, it is claimed, allows the novice to do clean, substantial work and the experienced mechanic to double his output with less effort and at a decided saving of time and material, for which reason it is in constant demand with automotive repair men and all other garage workers who require a solder that



may be quickly used and is always ready in a convenient form.

Kester solder consists of a hollow wire of genuine tin and lead which contains tiny pockets that hold an acid flux. Just before the solder is melted the proper amount of flux is released and with the melting of the genuine tin and lead solder, a permanent bond is created, saving time and effort and promoting cleaner and more substantial work.

For delicate electrical work, including radio, absolutely non-corrosive soldered joints are required. For this purpose Kester Rosin Core Wire Solder affords the most simple and convenient means of soldering, either by experienced or inex-



perienced persons.

Besides yielding a good profit, Kester Solder saves the dealer that time which he generally wastes in explaining the use of a separate flux.

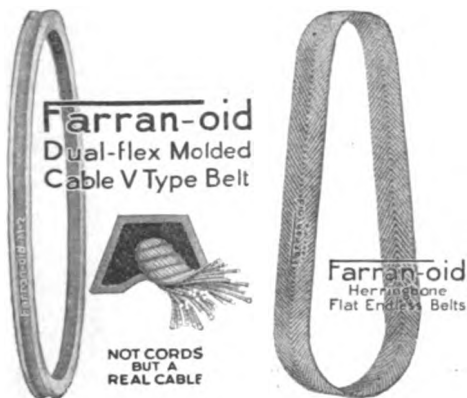
A Kester sale is quick, clean and accurate because this solder comes weighed and packaged—ready to hand over the counter.

Manufactured by Chicago Solder Company, 4201 Wrightwood Avenue, Chicago, Ill.

(When Writing to Advertisers, Please Mention the MOTOR TRUCK.)

Farran-old Fan Belts are made in both the flat endless and molded V types. The outstanding features of the former are the thinness of construction, which provides the maximum in flexibility and gripping qualities and the sealed edges of the belts, which add to the life and vitality of protecting the inner construction from the deteriorating elements of oil, water, gasoline and dirt.

The molded V belts have a patented dual-flex, or hollowed-in top. This feature insures great gripping qualities, for



when the belt is applied under tension the sides expand and firmly grip the sides of the pulley. The ordinary flat, solid top types contract and pull away from the sides of the pulley, thus causing slippage.

Fan belt troubles cause no end of damage with a motor as overheating it just once may ruin it. A slipping fan belt overheats the engine and warps pistons and cylinders, burns valves, strains and "racks" the entire mechanism, hence the damage caused by a defective fan belt may run into hundreds of dollars.

There is a keen demand for a quality fan belt and Farran-old fills the bill as representative jobbers throughout the United States have stocked the line to the exclusion of all other makes. Some of these jobbers have found Farran-old business so good that they have ordered by the car load. Among these are The Dine-

10 TO THE CARTON



DOUBLE SELVAGE HERRINGBONE WEAVE

DeWees Company of Canton, O.; The Pittsburgh Auto Equipment Company of Pittsburgh; The Herring Motor Company of Des Moines, etc.

The Chanslor & Lyon Company with eight branches on the Pacific coast have placed orders for nine carloads—a train load—of fan belts. This is without doubt the largest order ever placed for fan belts.

The Farran-Kinney Company is headed by Howard Farran, nationally known fan belt expert and an authority in the automotive field. Ralph P. Kinney is the vice president and S. R. Wolff secretary.

Manufactured by the Farran-Kinney Company of Chicago (327 South LaSalle Street), and Akron, O.



Bellevue Bumpers are manufactured for the Dodge Brothers, Willys-Knight, Overland "4", Studebaker, Buick Four, Buick Six, Overland, Maxwell, Hudson, Essex.

These bumpers have a minimum number of parts, there being only two pieces in each unit. A feature which appeals to the car owner is the fact that all bumpers bolt directly to the frame without necessity of drilling holes and there are no hooks or clamps used. The company stresses the point that every bumper is "tailor-made," or in other words, made to fit that particular car for which it is intended, thus doing away with any makeshift adaptations.

These bumpers are manufactured in narrow face or broad side type and are black enamel or plated, at following prices: Black enamel, front or rear, \$10.50; nickel plated, front or rear, \$12.50; black enameled broadside, front or rear, \$17; nickel plated broadside, front or rear, \$19.

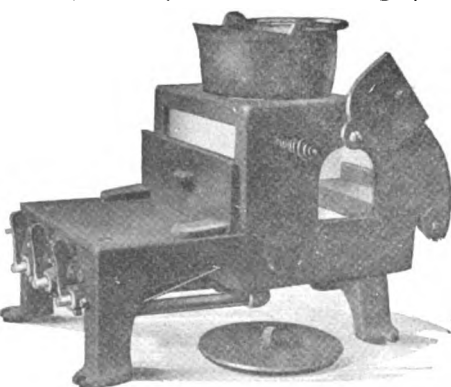
Manufactured by Bellevue Manufacturing Company, Bellevue, O.

Johnson 118 Bench Furnace is efficient for heat-treating carbon steel tools within its capacity. Heating of long rods is also possible by opening side doors of hood.

The lid on the hood may be removed (as shown in illustration) and a 20-pound capacity melting pot may be inserted for melting small quantities of soft metal. The baffle plate, as shown in front of the combustion chamber, retains the heat and secures an even temperature.

This furnace will handle the largest soldering irons, branding irons, stenciling irons, hatchet irons, etc.

Size of fire box, 6 1/4 by five by 6 1/4 inches. Mouth, four by six inches. Length, 16



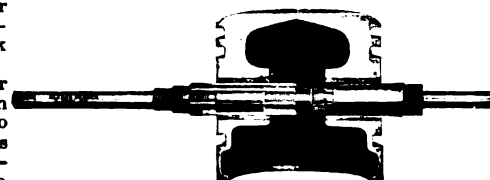
inches. Height, 9 1/2 inches. Net weight, 45 pounds. Gas consumption maximum, 40 cubic feet per hour. Each burner equipped with pilot light. Melting pot, six inches diameter. Width of side openings in hood, 2 1/4 inches.

Manufactured by Johnson Gas Appliance Company, Cedar Rapids, Ia.

Alvord Piston Pin Bushing Reamer is an adjustable piston pin bushing reamer with pilot. The cutter of this tool is very similar to the Alvord adjustable reamer and is adjusted in the same manner, but the shank and pilot stem are ground to an accurate sliding fit with the taper plug shown that are parallel and concentric with the cutting edge.

By passing the pilot stem through the piston pin bushings and then slipping the taper plug on the pilot and pressing it into the bushing, the reamer is centralized and supported and reams the bushings in correct alignment and with no chatter. With pistons of small diameter and correspondingly short pin length it is sometimes necessary to ream first one bushing, and then reverse the reamer and plug and ream the other bushing. In this case the second reaming operation is centralized from the bushing already reamed.

This tool is simple to operate as there is no adjustment necessary on the taper plug, which fact materially decreases the time necessary to fit a set of pins. The taper of the plug is sufficient to cover the range of adjustment of the reamer, but is

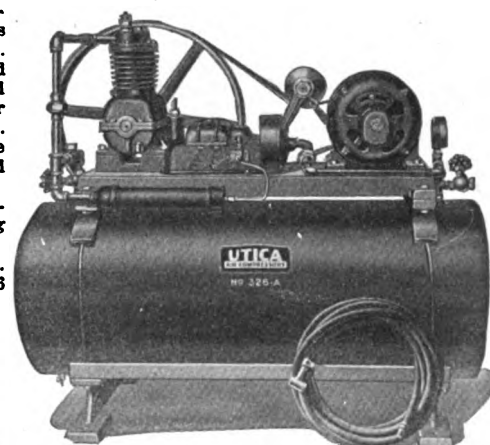


gradual enough to align the reamer in place.

The reamers are made in eight different sizes and cover a range from 3/8 to 1 15/32 inch. A special set designated as set No. 503, has been assembled which consists of four reamers and which will ream standard and oversize holes for practically all of the leading cars on the market. Steps are being taken to patent this tool.

Manufactured by Alvord Reamer & Tool Company, Millersburg, Pa.

Utica Air Compressors for all classes of air service now include heavy duty units for inflating giant pneumatic truck tires. These compressors which have been in-



stalled by many garages and filling stations throughout the country, are completely automatic, a special release valve permitting the motor to start without load. The company has recently added two-stage compressors to the line manufactured and expect to make delivery of these units on Nov. 15th.

Due to simplicity of construction and carefully thought out design this two-stage compressor is conceded to be the equal of anything on the market today and the company already has received a large number of orders for the machine, which comes equipped with hose and chuck and is ready to operate when current is applied.

Manufactured by Utica Compressor Company, Incorporated, 819 Hamilton Street, Utica, N. Y.

(When Writing to Advertisers, Please Mention the MOTOR TRUCK.)

Kwik-Ak-Shun Cylinder Compound, as the name implies, is a quick acting compound for lapping cylinders, pistons, piston rings, cast iron and malleable valves and cocks, brass goods and other hard metal. Like the several other products of this manufacturer it is a dry powder which is mixed with lubricating oil to a consistency depending on the way in which it is to be used, although differing from the company's other products in that the abrasive used is of a much coarser grade. The manufacturer states that Kwik-Ak-Shun is the only compound which will not imbed itself in the metal and prevents scored cylinders, which might result from the continued cutting that would be apt to result if this were not the case.

The method of using this compound is to mix it with the oil to the consistency of paint, keeping it thoroughly mixed to keep it from settling. It is then applied to the parts to be lapped and while lap-



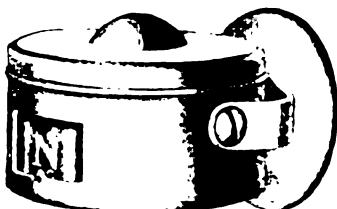
ping, oil is added as necessary, thus preventing any of the abrasive ingredients settling.

When a perfect surface has been obtained it should be carefully wiped with a dry cloth, after which the lapping action is continued for a few moments to produce a high finish.

A few of the prominent users of this compound are: International Harvester Company of America, the Huber Manufacturing Company, the Knight Manufacturing Company, Standard Motor Car Company, Westinghouse Electric & Manufacturing Company, Standard Steel Car Company, American Railway Express Company, Standard Oil Company, United States Postal Service, Domestic Engine & Pump Company, the Philadelphia Company, the J. T. Tractor Company, the Sleeper Company, the Caille Brothers Company.

Manufactured by the United States Products Company, Pittsburgh, Pa. Sales Division, Edward A. Cassidy Company, Incorporated, 25 West 43rd Street, New York City.

Cooper Directometer is another Cooper product of distinctive individuality which fills a long felt want of the motorist, as it tells at a glance the direction that the car is travelling. In effect it is a small compass on which eight principal points of direction are shown in the dial in luminous letters which are readily discernable at any time of the day or night. Practically every motorist, when touring especially, has felt an actual need for



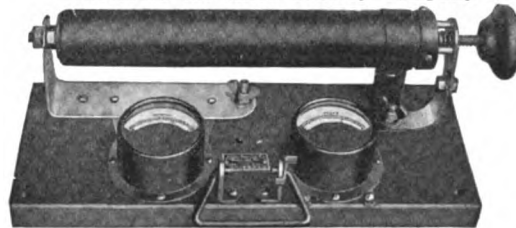
some sort of reliable compass which would aid him in checking up his road map, but to date the most common method has been to carry a small pocket compass which in itself was unsatisfactory simply because the metal in the car made it prac-

tically impossible for it to function properly.

The Cooper Directometer, however, has been so designed as to account for all influences of the metal in the car on the compass and it is stated will at all times show the proper direction. Like all other Cooper products the Directometer is guaranteed to give proper satisfaction to the owner and should it fail to do this the purchase price will be refunded.

It is constructed of aluminum and fully insulated by being attached to the windshield, full directions for which are given with each device.

Manufactured by Cooper Manufacturing Company, Marshalltown, Ia.



Allen-Bradley Test Set has been developed to meet the need for a uniform or standardized method of testing storage batteries, and also the demand for a scheme of testing which can be followed and understood by the customer. In co-operation with the storage battery manufacturers the Allen-Bradley Company has

developed the "chart method of locating battery trouble," based upon the Allen-Bradley high-rate discharge test.

To the average automobile owner battery testing is a mysterious process. Since he is not familiar with the instruments and methods employed in storage battery testing, the service station report conveys no other significance, as a rule, than that his battery may or may not need extensive repairs.

The report of the service station may be accepted, because the reputation of the station is such as to merit the confidence of the car owner in its methods and reports. Frequently, however, the customer will question the wisdom of opening his battery, or of discarding it and buying a new one. It then becomes a difficult job for the service station to convince the doubting customer, and the customer either agrees reluctantly to the suggestions of the station or he disregards them entirely and goes elsewhere for an independent opinion.

If the customer needs a new battery, it is important to clinch the sale before he leaves the service station, for if he goes elsewhere, he is not likely to return to purchase the new battery even if he learns later that the recommendation of the first station is correct. Such a course does not help the reputation of the service station, and it decreases the station's legitimate sales of new batteries.

Manufactured by Allen-Bradley Company, Milwaukee, Wis.

Triplexd Gasoline Hose for tank car unloading, tank wagons and barrel loading and unloading, and for filling station pumps, is made by one of two firms in America, producing under one roof and under one management, the hose of this kind, and Triplexd Hose for filling station pumps is insured for two years of service



(When Writing to Advertisers, Please Mention the MOTOR TRUCK.)

to those who will request an insurance policy, which is furnished free of charge. This hose is a consolidation of an electro-galvanized flexible steel tubing with compressed rubber cover firmly secured under great tensile strength by a woven fabric jacket of the best hose cord. It is used as standard equipment by practically all the pump and tank manufacturers in the United States," states the manufacturer.

Manufactured by Metal Hose & Tubing Company, Raymond and Tillary Street, Brooklyn, N. Y.

Arrow Grip Non-Skid Chains for pneumatic tires have several patented features which cause dealers who have seen the chain to believe that the new features will make it welcome to motorists and they



are backing their opinions by buying large quantities of the Arrow Grip Chain.

Cross chain replacement has always been a nuisance and an expense to the motorist. The Arrow Grip chain has a quick and easy cross chain replacement feature which removes all trouble.

This is accomplished through the Arrow Grip Cross Chain Fastener, which is patented. The fastener is in reality a hook containing a slotted button which



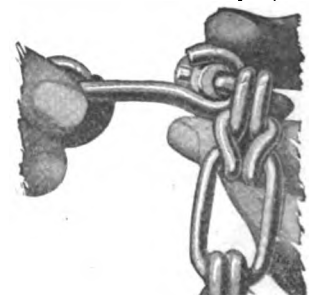
can be easily turned to remove from the side chains for replacing broken cross chain.

Arrow Grip pneumatic tire chains are all equipped with this new feature. The fasteners and cross chains are also sold separately for replacing cross chains on other makes of tires.

In using this fastener all it is necessary to do is to turn the button so the slot registers with the opening in the hook. This permits removal from the side chain.



Another turn of the button releases the broken cross chain. To put on new cross chain the end link is placed in the slot. The fastener is then turned so that the slot again registers with the opening in the hook when the cross chain falls into place. With the slot still open, the hook



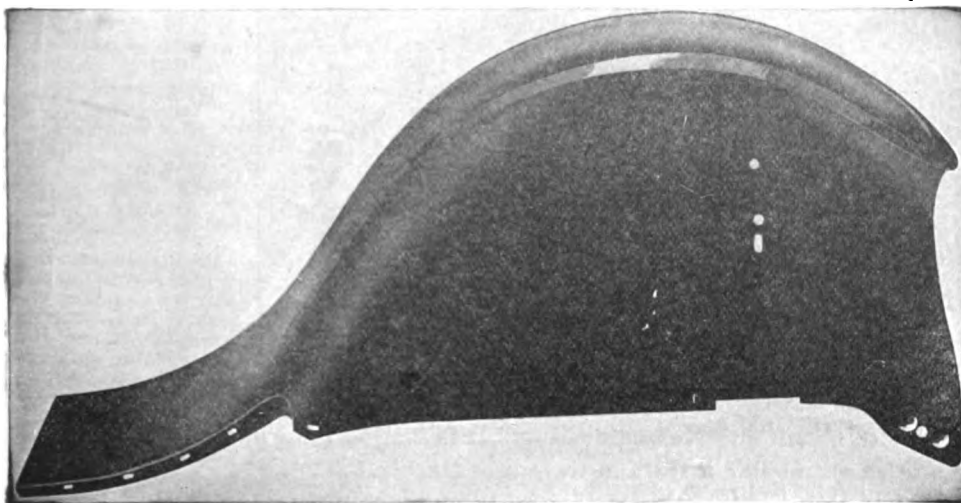
is placed on the side chain link and the fastener turned half way around to lock in position.

Manufactured by Arrow Grip Manufacturing Company, Incorporated, Glens Falls, N. Y.

Fostoria Fenders are replacement fenders of high quality which are widely used by repair shop and service station operators. The company, which has more than 30 distributors in the largest cities in the country, was formerly well known for sheet metal stampings manufactured for

ished auto fender stock is used, the same gauge of steel being employed as was used in the original fenders on the car.

It is also stated that each fender is so crated as to withstand the roughest handling in transit, being bolted and wired separately in a strong, well built crate so



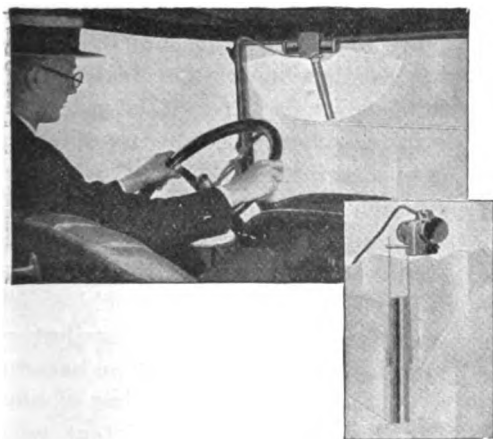
automobile factories, but the entire output of their modern plant now is devoted to replacement fenders of which more than 53 different models are carried in stock at all times. The company states that the fit of these fenders, which are very artistically designed, is guaranteed and that only the best grade of full fin-

planned that it will not rub against, or scratch the other fender. It is not possible to list all of the prices of this line, but dealers who have used the product state that considering the very high quality of goods the price is reasonable.

Manufactured by Fostoria Pressed Steel Company, Fostoria, O.

K-M Automatic Windshield Cleaner is unique in that both sides of the glass are cleaned by the one operation, due to the inside arm being provided with bleached wool felt wiper and the outside arm with pure gum rubber wiper. Provision is made for adjustment (no springs) of pressure of the parallel wipers which is evenly distributed throughout their length by being centrally pivoted to the arms, relieving all strain against the glass.

The K-M automatic is provided with a valve control mechanism that is positive-ly operable at all times; new principle;



extra power; simple and rugged in construction and readily accessible for occasional oiling by merely removing a cover plate.

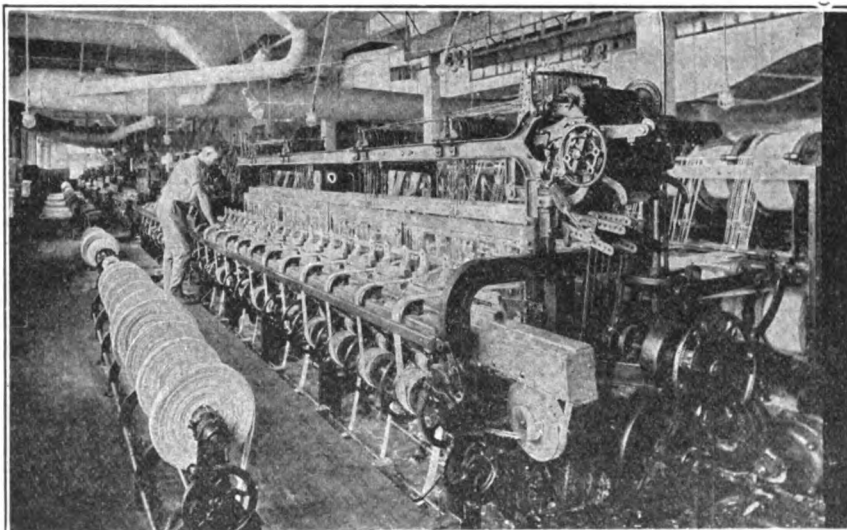
Directions for installing come with each cleaner.

This efficient cleaner was designed by engineers who were mindful of the imperfections in certain type of cleaners and they squarely meet the requirements of the ideal in the opinion of many who have used them.

Manufactured by K-M Manufacturing Company, Toledo, O.

Brake Lining, manufactured by a company which specializes in asbestos textiles and packings of all varieties is made of specially selected long staple asbestos fibers in combination with high grade brass wire, the whole making a solid wear-resisting lining which has met with the high approval of the user.

In addition to the careful selection of material entering into the lining and careful inspection of the processing and of the finished article, frequent tests are made



to insure the maintenance of the standard, the superiority of which to certain other makes of lining was recently demonstrated by impartial official tests. Rough, strong, long-wearing and dependable, the lining is built for the sole purpose of giving real service.

Proper attachment of the lining to the brake band is necessary with any lining to secure noiseless smooth braking action. The rivets should be of such size and

Universal Headlight Controller is designed so that the driver without releasing his hold on the steering wheel may give any degree of light desired by a simple touch of a lever on the steering post.

The new Universal headlight control is clamped to the steering post and its lever is operated by a gentle pressure of the finger without removing the hand from the wheel. To dim the lights the driver simply pushes the lever forward. The further he pushes it the dimmer the lights become. There is no sudden change from brilliant to dull. The light simply melts



down to whatever degree of intensity the driver desires—to a pin point if he wants. Consequently the road is never lost to view through a rude shock to the eyes.

Anyone can install the Universal Headlight Control. It is clamped rigidly to the steering post, at the most convenient height, in two minutes.

Manufactured by Universal Headlight Controller Company, 57 Street and Broadway, New York, N. Y.

shape as will hold the lining firmly against the tremendous pull resulting when the lining is brought against the drum. The lining should be drawn tight on the band. Failure on either of these will result in vibration and consequent noise.

Rivets should be inserted with heads in counter sunk depressions in the lining; else a protruding brass rivet head may hold the lining from proper pressure on the drum, reducing the braking ability,

and with brass rivet head sliding on steel drum, a noisy brake results.

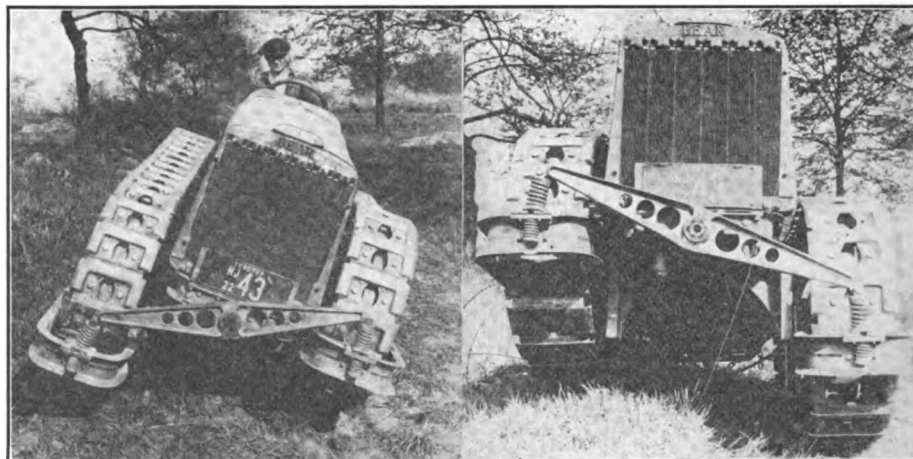
Both light brown and black clutch facings are carried in stock. They are equal quality and the color should be specified when ordering. If finish is not specified the black will be supplied on orders from New York district, light finish on all other orders states the manufacturer.

Manufactured by the United Asbestos Company, Manheim, Pa.

(When Writing to Advertisers, Please Mention the MOTOR TRUCK.)

Bear Tractor an Efficient Power Hauler

Illustration Shows Flexibility of This New Tractor for Which Much Has Been Predicted. Though the Machine



Weights Less Than Many Others It Is Said to Be Unusually Sturdy and Well Able to Stand the Arduous Work of the Farm.

THE Bear Tractor is a noteworthy piece of automotive engineering. It is distinctly new, and notwithstanding this fact, there is not a single experimental feature in the entire tractor.

In designing the Bear, only thoroughly established principles of engineering were followed. It is not an invention.

It is an engineering attainment—purely the result of correct utilization of what the best automotive engineers have proved to be sound practise.

The Bear is an unusual accomplishment because of the skill and science that were used in designing it.

THE power plant in the Bear is said to be unexcelled for economy and trustworthiness. In transmitting the engine power to where it can be used, the Bear probably has never been excelled in the tractor field. The fact that it delivers, it is claimed, 80 per cent. of the engine horsepower at the drawbar gives the Bear instant recognition for its mechanical efficiency and this performance is implied in the Bear slogan: "The Tractor That Delivers Its Power to the Drawbar."

To mention only a few of the advantages of the Bear as outlined by the manufacturer, it is light, but strong, turns around in a six-foot radius, requires oiling only once a month, delivers 80 per cent. of the engine power to the drawbar, has 95 per cent. of its weight practically spring mounted, forces the track to grip the ground throughout its full length, operates similarly to standard automobile, has three-point suspension frame, allowing 16-inch oscillation of front wheels, equipped with ratchet track adjuster.

"The quality of the Bear," states the manufacturer, "is reflected by the use of more than 700 pounds of alloy steel, rugged shafts without

overhang, 36 annular ball bearings (no plain bearings), spline fits, S. A. E. bolts and nuts throughout, heavy broad-faced stub-tooth gears, manganese steel track links, drop-forged grousers, pressed steel track rollers, spring cushioned upholstered seat.

"Bear design, quality and workmanship combine to make the Bear a tractor of unprecedented utility. With its 100 per cent. overload capacity for emergencies, its low operating cost, and low maintenance cost, it has created a new standard by which to measure tractor values. Not only does its mechanical and power flexibility make the Bear adaptable to widely varying kinds and conditions of work, but its low cost, as determined by the expense of work accomplished, adds still more to the adaptability of the Bear. In the final analysis it is this broad interpretation of tractor adaptability that determines Bear utility in fields where dependable and economical tractor power is desired.

"The utility of the Bear tractor is limited only by the need of 25 to 50 horsepower at the drawbar for draft work, and 35 to 70 horsepower at the pulley for portable belt work.

"The adaptability of the Bear to

a wide range of work and to varying conditions makes it the universal tractor wherever a machine of its normal horsepower is required. In the first place, being of the crawler type, the Bear enters the largest field of tractor usefulness, and then within that field it is eminent because of the many features that distinguish it."

It is the belief of the Bear company that there is a sufficient number of distributors and dealers who hold views similar to its own to constitute, when brought together in common interest, a sales organization which will easily handle the factory output on a constantly increasing production. It is the desire of the company to grant franchises for open territory as fast as distributors and dealers of the Bear type become available. But the granting of new franchises must be consistent with the interests of all distributors and dealers who have previously joined the Bear selling organization.

BEAR SPECIFICATIONS.

Engine—Four-cylinder; tractor type.
Bore and Stroke—4½ by 6½.
Valves—(In head) 2¼ inches diameter.
Crank Shaft—2½ inches diameter, chrome-nickel steel.
Ignition—Bosch magneto, with automatic impulse coupling.
Governor—Simplex; gear driven.

Carburetor—Schebler carburetor. Latest model, especially designed for burning low grade fuels.

Fuel Tank—Capacity, 42 gallons.

Air Clarifier—Highly efficient; especially designed; oil type.

Engine Clutch—Five plate; dry.

Cooling—Spirax sectional radiator. Force-feed pump, gear-driven fan, delivering 9000 cubic feet of air per minute.

Lubrication—Force-feed to all engine bearings, including valve gear.

Transmission—Spur gear type. Unusually large margin of safety insured by use of coarse-pitch, wide-faced, chrome-nickel, double heat-treated gears, as well as short, heavy shafts of same materials. Three speeds forward, one reverse.

Drive Clutches—Multiple-disc, running dry, 19 inches diameter, exclusive Bear design.

Bearings—All of annular ball type throughout, packed against leakage of oil and entrance of dirt.

Track—Drop-forged, running dry, each unit readily detachable; of known performance and superior wearing qualities.

Tread Wheels—Front and rear wheels 32 inches diameter.

Grousers—Knife-edge, drop-forged, readily detachable for road work.

Length of Tread—On ground, 64 inches.

Width of Tread—12 inches.

Area on Ground—1536 square inches.

Weight—5500 pounds net; 6000 pounds loaded with fuel, oil and water.

Ground Pressure—3.5 to 3.9 pounds per square inch.

Turning Radius—6 feet.

Horsepower Rating—25 horsepower at drawbar; 35 horsepower at pulley—100 per cent. reserve capacity.

Normal Drawbar Pull—3000 pounds.

Speeds—5.9, 3.4 and 2.1 miles per hour; 2 miles per hour in reverse.

Steering—Both treads are controlled by steering wheel operating individual multiple-disc clutches on tread drivers. Five pounds pressure on the steering wheel operates the clutches.

Belt Pulley—Standard pulley is 12 inches diameter by 9-inch face. Other sizes obtainable on special order.

General Dimensions—Width, 60 inches; width over tracks, 55 inches; height over tracks, 42 inches; height over radiator, 54 inches; length, 118 inches; length, exclusive of seat overhang, 112½ inches; clearance, 11 inches.

Number of Plows Recommended—Four 14-inch.

Price—\$4250.

Walter Carl Peterson, who until recently was manager of the alloy steel division of the Electric Alloy Steel Company, Youngstown, O., has accepted a similar position with the Atlas Steel Corporation, Dunkirk, N. Y.

R. M. Upton, who was formerly connected with the Liberty Carburetor Company, Providence, R. I., is now superintendent of service of the Dodge Bros. agency in that city.

Harold C. Neelans has been appointed inspector of machine switching installation with the Western Electric Company, New York City, and is located at Brooklyn, N. Y.

Carel T. Torresen has accepted a position with the Gray Motor Company, Detroit. He was formerly tractor engineer in the tank, tractor and trailer division of the Ordnance Department at Rock Island Arsenal, Ill.

Louis K. Gordon has been appointed chief engineer and supervisor of purchases for the Bethlehem Motors Corporation of New York, East Allentown, Pa. He was previously engineer for the G. & S. Engineering Company, Plainfield, N. J., which company was dissolved.

Proposes Gas Tax to Maintain Roads

THE proposal to place a tax on every gallon of gasoline consumed by motorists for the purpose of raising funds to build new highways is gaining ground in this country, while at the same time the movement has spread abroad. These who sponsor such a tax are doing so on the theory that those who derive the greatest benefit from good roads should bear the greater portion of the burden. It is argued that the man who travels only about 5000 miles annually over the highways of the various states should not be forced to pay as much as the owner of a motor car or truck who probably travels as much as 15,000 or 20,000 miles or more, as the wear and tear in the latter case would naturally be greater than in the case of the former.

THOMAS H. MACDONALD, chief of the bureau of good roads, according to the National Petroleum News, has figured that it is possible to raise a revenue of \$40,000,000 annually for good roads by imposing a tax of one cent a gallon on gasoline used by all varieties of motor driven vehicles using the public highways. This proposal, however, is not an original one, as the plan already is in effect in several states and more are expected to adopt it during the present year.

"This method of raising funds," says Mr. MacDonald, "is rapidly growing in favor and has been adopted in Arizona, Arkansas, Colorado, Connecticut, Georgia, Kentucky, Louisiana, Maryland, Mississippi, Montana, New Mexico, North Carolina, South Dakota and Washington. Of these states only Oregon, New Mexico, Colorado and Kentucky had such a tax prior to Jan. 1, 1921. The tax in Maryland, Mississippi and South Carolina has been adopted during the present year."

This system of levying taxes on those who benefit the most, it is pointed out, has been considered by many experts, and various plans have been successfully worked out

for the apportionment of heavy assessments for public improvements over large areas. In this way, it is claimed, both those directly and those indirectly benefited pay their share.

In England the question of imposing a tax upon gasoline in lieu of the present horsepower tax on motor cars and trucks has been receiving the attention of the authorities during the past few weeks. Commenting on the proposal, the Petroleum Times of London says: "There is no doubt that the suggested reintroduction of the spirit (gasoline) tax is by far the most equitable. The motor legislation committee, of which Sir W. Joynson-Hicks, M. P., is the chairman, has, together with other interests, drafted a new taxation system which ought to effectively meet the case in that it makes the person who uses the roads to the greatest extent pay the great sum toward their upkeep. The suggestion is that motor spirit shall bear a tax, while the annual registration and license tax upon automobiles shall be a nominal amount. The new method proposes one flat rate upon all imported motor spirit used by motorists."

Leonard R. Woods has been appointed apparatus sales manager for the Fred Medart Manufacturing Company, St. Louis. He was formerly a salesman for the Dorris Motor Car Company, also of St. Louis.

Edward P. Kerrulsh has become associated with the Bishop & Babcock Company, Cleveland, in the capacity of assistant manager of automotive appliances.

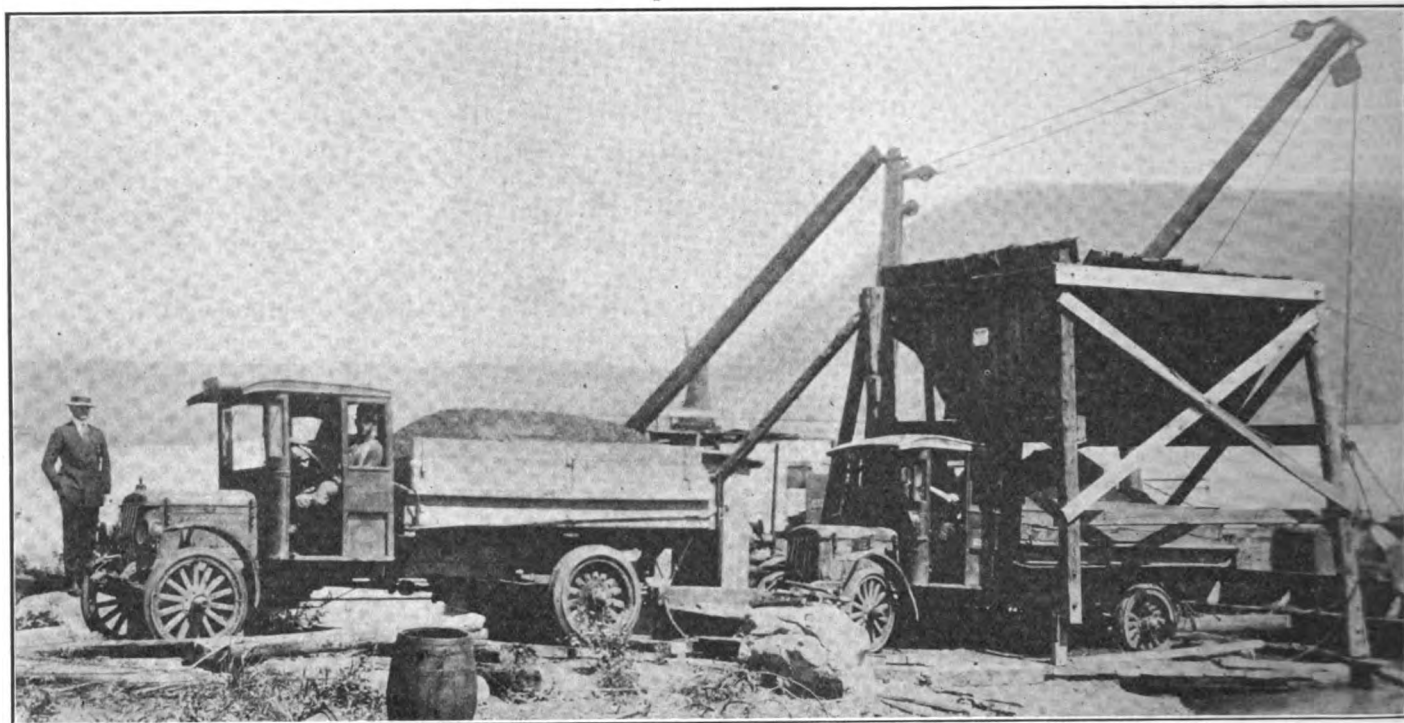
Charles Froesch, until recently research and field engineer for William E. Kemp, New York City, has become designing engineer for Mack Trucks, Inc., also of New York City.

Herbert G. M. Fischer has joined the development department at the Bayway refinery of the Standard Oil Company of New Jersey, Elizabeth, N. J., in the capacity of engineer. He was previously assistant research engineer for Klaxon Company, Newark, N. J.

Henry L. Butterworth has severed his connection with the Alena Steam Products Company, Indianapolis, where he was chief draftsman. His plans for the future have not been announced as yet.

Lewis S. Edgerton is now an instructor in mechanical engineering at the Mechanics Institute, Rochester, N. Y. He was formerly engineer and designer for the Dutcher Machine Company, Fulton, N. Y.

Take Coal From River Bed



Transport Trucks Have Given a Good Account of Themselves in Hauling Coal from the Bed of the Susquehanna River. The Going Is Heavy, but They Have Stood Up Nobly Under the Hard Work.

REMOVING coal from the bed of the Susquehanna river is another industry that can be added to the wide and growing range of profitable operation of the motor truck.

In this case two 5000-pound Transport trucks owned by S. F. Yeager and H. E. Bear, both of Harrisburg, are doing the work.

The coal is brought up from the river bottom by suction produced by an engine in a barge. The coal is dumped in the barge and brought to shore, where it is loaded into the trucks.

It is frequently necessary for the trucks to go out into the river, up to the hubs, for their loads. At best there is nothing but loose boards to afford traction.

The start-off is a real test of power, as is the pull all the way through. The road to the store houses is a mere trail with ruts so deep that rear axle actually drags on the crown of the road much of the way. The grade from the road to the unloading platform, which the trucks must ascend in reverse, is very steep.

The Transports have been on this job every work day, each truck hauling 25 four-ton loads a day for over two years. Mr. Holmes and Mr. Stewart, in charge of this operation, say the trucks have never failed to take out their loads.

Men especially interested in the capabilities of the motor truck under extraordinary difficulties are constantly going to Harrisburg to see the operation. Because of the severity of the demands, tests have been made of a number of competing trucks.

The 5000-pound model of the construction used by Transport Truck Company of Mount Pleasant, Mich., has met all the conditions most satisfactorily—though they are required to operate under 8000 pounds loads—a 3000-pound overload.

Gasoline Production Decreases

PRODUCTION of gasoline in September amounted to 536,491,988 gallons, which is a decrease of 2.45 per cent. from the August output, but an increase of 28.68 per

cent. over the figures for September, 1921. Exports of gasoline for the month were 44,833,609 gallons; imports were 4,563,315 gallons, and shipments to insular possessions amount to 1,974,668 gallons. Stocks of gasoline on hand Oct. 1, were 690,050,809 gallons, a decrease of 13,700,000 gallons during the month.

The number of operating refineries reporting to the Bureau of Mines in September was 309 as compared with 295 operating in August. These plants operated at 88.52 per cent. of their indicated capacity.

Production of kerosene in September amounted to 197,935,102 gallons, an increase of approximately 13,500,000 gallons, or 7.35 per cent. over the August output and about 44,000,000 gallons, or 28.51 per cent. above the figure for September, 1921. Stocks of kerosene Oct. 1 were 270,576,864 gallons, a decrease of 15,000,000 gallons for the month. Kerosene exports and shipments to insular possessions in September amounted to 72,114,973 gallons.

The output of gas and fuel oils in September amounted to 917,857,786 gallons.

M. & A. M. A. Names New Members

GENERAL MANAGER M. L. HEMINWAY of the Motor and Accessory Manufacturers' Association, announced today that membership had passed the 415 mark.

The number of parts and equipment makers now listed on the association's roster is greater than ever before in the 18 years of the association's service to the automotive industry.

"We are welcoming new concerns into the fold every week," said Mr. Heminway. "But the high standards of eligibility and prestige are maintained with unflagging vigilance."

"**G**ENERALITIES and pompous boasts fade out into nothingness. But a fact is a fact—and cold figures cannot be denied. Let me remind you of the significance of that number 416. It means 416 fellow manufacturers united under a single banner, not merely for the fun of playing the game, and being good fellows, but actually helping one another and advancing the ideals and common aspirations of their industry through teamwork, which is a day to day reality and not simply a matter of lip loyalty." The new members are:

Akron-Selle Co., Akron, O.
 Aluminum Company of America, Pittsburgh, Pa.
 Aluminum Die Castings Corporation, Carwood, N. J.
 American Chemical Paint Co., 1126 S. 11th St., Philadelphia, Pa.
 American Taximeter Co., 16 W. 61st St., New York, N. Y.
 Arrow Grip Manufacturing Co., Cooper St., Glens Falls, N. Y.
 Automotive Products Corp., N. Pine and Holley Sts., Hazelton, Pa.
 Auto Specialties Mfg. Co., St. Joseph, Mich.
 Baker, R. & L. Co., 2100 W. 25th St., Cleveland, O.
 Baush Machine Tool Co., Springfield, Mass.
 Bijur Motor Appliance Co., Hoboken, N. J.
 Britton Auto Products Co., Inc., 117 W. 63rd St., New York, N. Y.
 Broad Brook Co., 32 Union Sq., New York, N. Y.
 Buckeye Forging Co., Cleveland, O.
 Bullard Machine Tool Co., Bridgeport, Conn.
 Canton Drop Forging Mfg. Co., Canton, O.
 Columbus Bolt Works Co., 162 W. Randolph St., Columbus, O.
 Cuno Engineering Corp., Meriden, Conn.
 Dalton & Balch, Inc., 2333 Mich. Blvd., Chicago, Ill.
 Delphos Bending Co., 901 S. Main St., Delphos, O.
 Empire Tire & Rubber Co., Trenton, N. J.
 Everyday Piston Ring Co., Roosevelt & Conn. Sts., E. Rochester, N. Y.
 Franklin Die Casting Co., Gifford and Magnolia Sts., Syracuse, N. Y.
 Glidden Co., Cleveland, O.

Harvey Spring & Forging Co., Racine, Wis.

Holley Carburetor Co., Detroit, Mich.
 Hoover Steel Ball Co., Ann Arbor, Mich.
 Houdaille Co., The, Buffalo, N. Y.
 Indiana Steel Products Co., Chicago, Ill.
 Morand Cushion Wheel Co., 800 S. May St., Chicago, Ill.

Metropolis Bending Co., Metropolis, Ill.
 Morgan Mfg. Co., Keene, N. H.
 Muzzy-Lyon Co., 11037 Shoemaker Ave., Detroit, Mich.

Nairn Linoleum Co., 5th Ave. & 47th St., New York, N. Y.

Packard Electric Co., Dana Ave., Warren, O.

Pharo Mfg. Co., The, Bethlehem, Pa.
 Pines Mfg. Co., 408 N. Sacramento Blvd., Chicago, Ill.

Recording Devices Co., Dayton, O.
 Scintilla Magneto Co., Inc., 225 W. 57th St., New York, N. Y.

Spencer-Smith Machine Co., Howell, Mich.

Standard Parts Co., 1280 W. 73rd St., New York, N. Y.

Spiro Manufacturing Co., C., 68-72 W. 131st St., New York, N. Y.

Stemco Engineering Co., Dayton, O.
 Taylor Truck Works, C. A., 878 N. Halsted St., Chicago, Ill.

Ternstedt Mfg. Co., Detroit, Mich.
 Trumbull Steel Co., Pine St., Warren, O.

Universal Products Co., Detroit, Mich.
 Westinghouse Lamp Co., 165 Broadway, New York, N. Y.

Whyte-Duffield Mfg. Co., 215 S. Leavitt St., Chicago, Ill.

Wickey Battery Co., E. Chicago, Ind.
 Wood Hydraulic Hoist & Body Co., 7924 Riopelle St., Detroit, Mich.

Wyman-Gordon Co., Worcester, Mass.

Motor Buses Operated by Tourist Agency

THE first tour to be made in the new style "buses de luxe" started from New York recently when the Mohawk left with a capacity load of 18 passengers for an overland trip to Trenton, Philadelphia, Gettysburg, Luray Caverna, Washington and Atlantic City.

GEORGE E. MARSTERS of Boston, president and general manager of the Marsters tourist agency, has introduced in the East

a plan of overland automobile trips throughout this section, although already it is being successfully operated in the Middle West. The plan was inaugurated last spring in New England, trips from Boston, Providence, Albany, Niagara Falls and Montreal being made. The business developed so that additional cars were secured, and a regular tourist schedule was outlined.

This fall another car was secured and orders were placed for two more for use between New York and Washington. Guides and lecturers are supplied to inform the tourists of the points of interest visited.

The cars themselves, as described by John F. Gibson, manager of the New York office of the tourist agency, are entirely new in this part of the country.

"We ordered them made according to plans drawn up by Mr. Marsters," Mr. Gibson explained. "They are of the closed limousine type, with a comfortable seating capacity for 18 passengers and the driver. Under each seat is a heating plant, and all windows can be closed in case of inclement weather. The car is driven by a 50-horsepower engine."

"There is a separate baggage compartment in the rear of the machine so that the passengers will not be crowded under foot by their luggage. The wheelbase is the longest produced on any car in practical passenger service, measuring over 190 inches. Mahogany wood work, real leather seats, soft springs and electric lights add to the riding comfort of the machine."

The operation of this line is being watched with interest by many who see in the new idea a long forward step for passenger transportation which eventually may make possible a cross-continent bus service.

Tail Light Law Enacted

WHILE motor officials of other states are still wrestling with the automobile headlight situation, Massachusetts, apparently satisfied that it has solved that problem in a fairly satisfactory manner, is now tackling very vigorously the question of tail or rear lights.

A new tail lamp law goes into effect on Jan. 1 in that state and the changes which are rendered imperatively necessary by that law have disturbed to some extent manufacturers as well as Massachusetts motor car dealers and owners.

In view of the widespread interest in proper automobile lighting this attitude on the part of Massachusetts in tail lamp legislation is of considerable importance, because undoubtedly it will pave the way for some necessary changes in all of the eastern states and ultimately, no doubt, throughout the country.

THIS society, it may be said, working with the standards committee of the Society of Automotive Engineers, adopted specifications for automobile headlights about five years ago, and these have been adopted by the 10 states comprising the Interstate Conference Motor Vehicle Commissioners, being the six New England states, with New York, Pennsylvania, New Jersey and Maryland. They are also in use in other states. New York, notwithstanding its laxness in this respect, as admitted at a recent meeting in this city by Bert Lord, director of the state motor vehicle bureau, is now coming up to the standard of some of these states, and in its revision of lenses has already cast out 67 of those formerly approved and several others will probably meet the same fate before the end of the year.

In speaking of the tentative specifications announced by the Massachusetts Register of Motor Vehicles, Frank A. Goodwin, Dr. Clayton H. Sharp, chairman of the Illuminating Engineering Society's committee on automobile lighting, just before sailing for Europe to study lighting conditions abroad, said that while definite specifications had not been adopted by the committee, the practical application of the Massachusetts regulations would undoubtedly form a fundamental basis upon which to work, and certain details, of whose excellence he was in doubt, satisfactorily could be adjusted as the result of experience.

In formulating its new tail lamp regulations Massachusetts has been fortunate in having on its motor advisory staff Alfred W. Devine, who

is chairman of the sub-committee of members of the motor vehicle lighting committee of the Illuminating Engineering Society and the lighting division of the Society of Automotive Engineers. That committee has been doing considerable experimental work on rear automobile lights, but has not yet made its final report.

Without going into too many details, it may suffice to say that the requirements drawn up by Mr. Devine with Registrar Goodwin's approval require a bulb to illuminate the number plate of not less than two candle power, that the slot through which the light shines shall be covered with glass, that it shall

be so constructed that the lamp and bracket to which the number plate is affixed shall be one device, and that the lamp shall be above the center of the plate. The law also requires that the white rear light shall be so placed as to make the plate number visible at a distance of 60 feet from the rear of the car. The New York requirement and that of most states is 50 feet.

For oil or acetylene lamps, the Massachusetts requirements specify a four candle power light and these lamps may be placed at the left end of the plate.

The Massachusetts tail lamp law has been discussed by the legislative committee of the National Automob-

EXPLAINS MASSACHUSETTS TAIL LIGHT LAW.

ANY car or truck dealer, any owner of a motor vehicle, or any accessory man, who wanted to know what rear lights had been approved, had a chance to find out recently at the Boston City Club in Boston.

The Motor Truck Club arranged the meeting at which Frank A. Goodwin, motor vehicle registrar, explained the law.

After the room was darkened for moving pictures Mr. Goodwin exhibited on a stand examples of nonapproved tail lamps and also those approved in order that those present may form some definite idea of the objectionable tail lights in use at the present time as compared with the approved tail lamps.

In view of the great importance of this presentation by Mr. Goodwin, the Motor Truck Club invited members of the Boston Automobile Dealers' Association, Boston Commercial Motor Vehicle Association, Automobile Legal Association, the National Automobile Association, the Bay State Automobile Club and the Massachusetts Automobile Operators' Association were present.

The club also extended invitations to any automobilist, motor truck owner or driver who was interested in this presentation.

Previous to Mr. Goodwin's talk a three-reel film, "The Story of the Tire" from the forest to the motor vehicle, was shown through the courtesy of the Goodyear Company.

bile Chamber of Commerce, and one of the members stated that the original requirement of making the lamp and bracket an integral part of the number plate had been modified to the extent that the lamp should be solidly affixed to the plate.

Conformity with this law will make it necessary for all manufacturers to manufacture a new style of rear lamp if they would sell their product in Massachusetts.

The committee of the National Automobile Chamber of Commerce has, very wisely, suggested a voluntary acceptance of the law. **The result virtually will be that all cars in the near future will be fitted with rear lights conformable to the Massachusetts law, thereby automatically enacting better regulations in all states whether done by legislative act or not.** Indeed, it is stated that all of the other nine states in the interstate conference for uniformity in motor laws will soon adopt the Massachusetts policy, perhaps with minor improvements. For owners of old cars in Massachusetts Mr.

Devine is quoted as saying that the expense of providing proper rear lamps will not exceed \$3, and some of the tail lamps submitted and approved can be made to sell for \$1.50 to \$2, according to the information given to Mr. Devine.

An investigation of tail light efficiency was lately made by Registrar Goodwin in several cities, and of 205 cars stopped and whose rear lights were tested, only one was found that conformed to the new law. In 176 cases the lamp was improperly located, in 124 cases the lamp had defective celluloid or no coverings of the lamp slot, and in 97 cases the slot was too small. Practically every careful observer of automobiles on the city streets at night will recognize that the rear lightings, in so far as it illuminates the plate number, is not what the law requires it to be. At a distance of even 25 feet it would often be difficult to see the entire number. Two or three figures might stand out with tolerable clearness. The law does not state how the lamp shall

be affixed, and, so far as known, Massachusetts is the first state to establish a definite situation where the light may do the most good.

Another detrimental feature in regard to the illumination of number plates is due to their grimy and dusty condition. This may be due to carelessness, but it is quite possible that some owners do not object to a little obscurity caused by the dust and grime of the road. In Pennsylvania last summer the police in two or three towns stopped a number of motorists and obliged them to clean the number plates on the spot.

The law says that the light shall illuminate the plates, and if the light is all right the next step will probably be to insist with more rigor that the numbers are clear enough to be illuminated.

The list of approved rear lamps for Massachusetts, it is stated, will be made by Nov. 15, so that manufacturers can make proper provision for equipment on cars sent out after the first of the year.

Plan for Body Builders' Second Show

ELABORATE preparations are being made to make the Second Annual Body Builders' Show in New York a thoroughly representative exhibit.

This exposition will be held the week of Jan. 8th to 13th in the 12th Regiment Armory. This is the same week as the National Automobile Show in Grand Central Palace.

During this week the Automobile Body Builders' Association will hold its annual convention in conjunction with the Auto Body Show.

THIS association includes in its membership and associate membership the leading manufacturers of bodies, body materials and parts therefor. Under the leadership of its president, John Graham, it has developed into a well knit, strong organization, and is becoming more of a factor in the industry each season.

A large number of the representative American automobile body builders have engaged space in the show. Realizing that the great majority of prominent automobile men are in New York City during that period, exhibitors see the value of putting automobiles bodies and parts before the great number of visitors.

Applications for space are being received daily at headquarters of the exposition, 1819 Broadway, New York, and as the Body Builders' Association in itself numbers 125 members and associate members, it is believed that all of the floor space will be spoken for long before the opening date.

The purpose of this show is to educate and unify the interests connected with motor car body building; to help to maintain the industry in its rightful position in the automotive field and to show to the public the merits of body materials and parts.

Both passenger bodies and those for commercial vehicles will be displayed in profusion. The former in-

clude not only exclusive, ultra fashionable custom bodies, but standard equipment as well. The increasing popularity of the enclosed cars has resulted in many improvements in construction and design and the very latest of these will be offered.

Latest ideas in body painting and trimming will be featured, marked advances having been made along this line in the past couple of months.

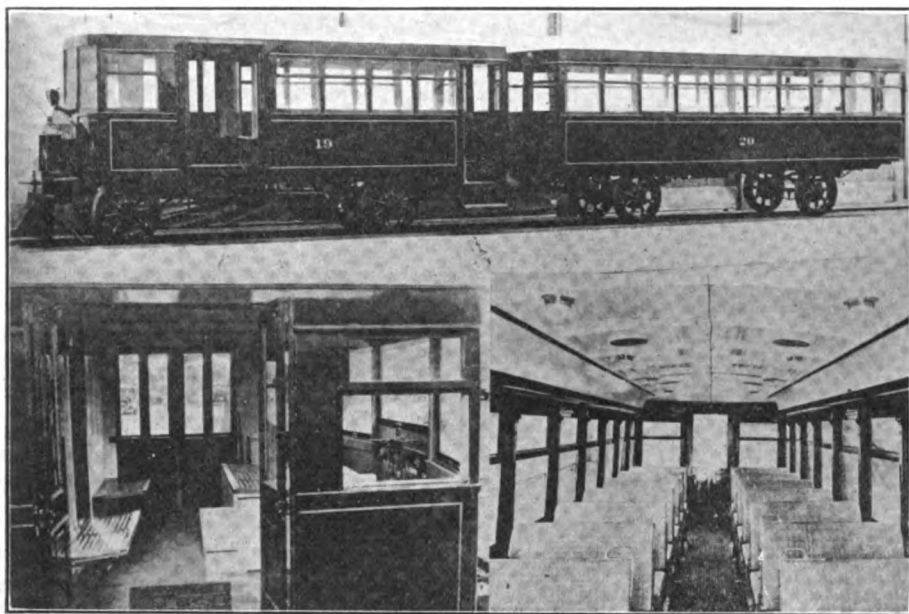
Commercial bodies will show a wider variety of adaptability than ever before and especially interesting to many will be the offerings in motor bus bodies. The increase in the number of motor bus lines throughout the country is responsible for many of these new types.

Cape Fear R. R. Installs Bus Train

TWO FWD railway motor cars and one trailer coach, all equipped with semi-steel bodies, built by the J. G. Brill Company, are being installed into passenger service on the lines of the Cape Fear Railways, Incorporated.

One of the cars will operate independently, while

the other will pull the trailer coach. The motor cars are identical in design and construction, having a baggage and passenger compartment; the passenger compartment seats 16 persons and emergency seats of the folding type for 11 passengers are provided in the baggage compartment.



Composite Picture Showing F. W. D. Train and Interior of Coach.

THE two motor cars have electric starting and lighting outfits, sanding devices, air brakes and heating devices which utilize the

heat from the motor exhaust, while the trailer coach has air brakes, electric lights and heaters. The cars are all well finished inside and afford a

comfortable means of transportation to the public.

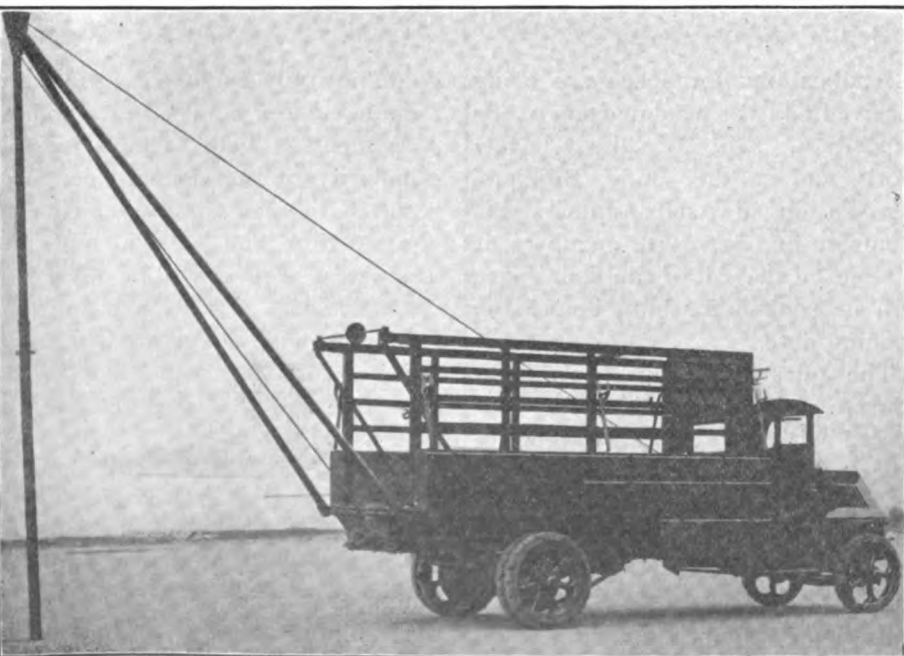
In delivering the equipment from Philadelphia to Fayetteville, N. C., a distance of 460 miles, under their own power, the longest single run yet made with motor railway equipment, was completed without difficulty. On this run the motor cars were hooked on to either end of the trailer coach and the one at the front end was used as the power unit. They left Philadelphia at 8 a. m. and arrived at their destination the same evening after making a number of stops to show the cars to railroad officials along the line. This 460-mile run was made over the tracks of the Baltimore & Ohio, the Richmond, Fredericksburg & Potomac and the Atlantic Coast Line Railroads. An average of 6.1 miles per gallon of gasoline was made, although considerable gas was used in idling the motor and in backing on to sidings. This mileage was made with only one of the cars being used as a power unit and pulling a trailer and a dead motor car, and a speed of as high as 27 miles per hour was attained.

Considerable interest was attached to this run all along the line as it was considered an exceptionally unusual undertaking for motor equipment.

The accompanying photo shows the exterior of the two-car unit and the interior of the trailer coach and baggage compartment of the motor car.

Ernest F. Paepfer has accepted the position of mechanical engineer for the Yellow Cab Manufacturing Company, Chicago.

Frank Lester Knowles, who formerly attended the Ohio State University, Columbus, O., has accepted a position with the Foos Gas Engine Company, Springfield, O.



Flatbush Gas Company Saves Time and Money by This Arrangement.

Gas Company Uses Special Truck Equipment

Kettering Addresses S. A. E. Meeting

A ROSTER of the automotive engineers and automotive production men who attended the banquet held in connection with the first annual production meeting of the Society of Automotive Engineers in Hotel Statler, Detroit, would read like a directory of "who's who" in the automobile industry.

C. F. Kettering, president of the General Motors Research Corporation, struck the keynote of the after dinner speakers when he stated that "hundreds of millions of dollars had been lost in the automobile industry because the production man was not called in when the engineers were drawing up their plans."

"IN FACT the production man and the designing engineer should be the two most closely associated men in the plant," he stated. "I believe we do not have to be secretive. Let the production man see it before it has gone too far. And the engineer should not be too finicky and set about having all the details of his plans go through.

"The question of costs, too, should be put into every line of drawing. If the accountant worked with the engineer and production man, he would be able to inject into the plans thoughts concerning the fundamental economy of the job. If we considered more the productibility and cost of a piece before design, we could then guarantee a lower cost on the product when it reached the final stage.

Pierre S. du Pont, president of the General Motors Corporation, spoke briefly and to the point.

"Great groups in the automobile industry are struggling against each other only in imagination," he said. "In reality, we are all working together and what develops to benefit one of us benefits all of us.

"We all know that the present cars are imperfect, but just how we can remedy the defects at once we do not know. We are fortunate to be in an infant industry. As yet there are thousands of uses for the automobile we know nothing about. We are the only nation using the automobile. Yet the mass of the population of the world lives outside the United States. The next few years will be full of development, full of interest for all of us in the industry."

A. B. C. Hardy, president and general manager of the Olds Motor Works, Lansing, Mich., made the principal address of the evening.

Mr. Hardy lauded the production

man, declaring that 80 to 90 per cent. of the territory of the factory was covered by him.

"College training can give the science of production but not the real thing," explained Mr. Hardy. "You get your experience along the line and you pick your men from along the line. A production man must have stick-to-itiveness and backbone as well as brains.

"But it is only today, after the industry is 21 years old, that we are holding the first production engineering meeting. Should not the logical expansion open for production engineers and plan engineers.

"Plans must be sold to the production department today as to the makeableness of a product.

"Furthermore, cars should be so designed that 80 per cent. of the repairs can be made with the car in the chassis."

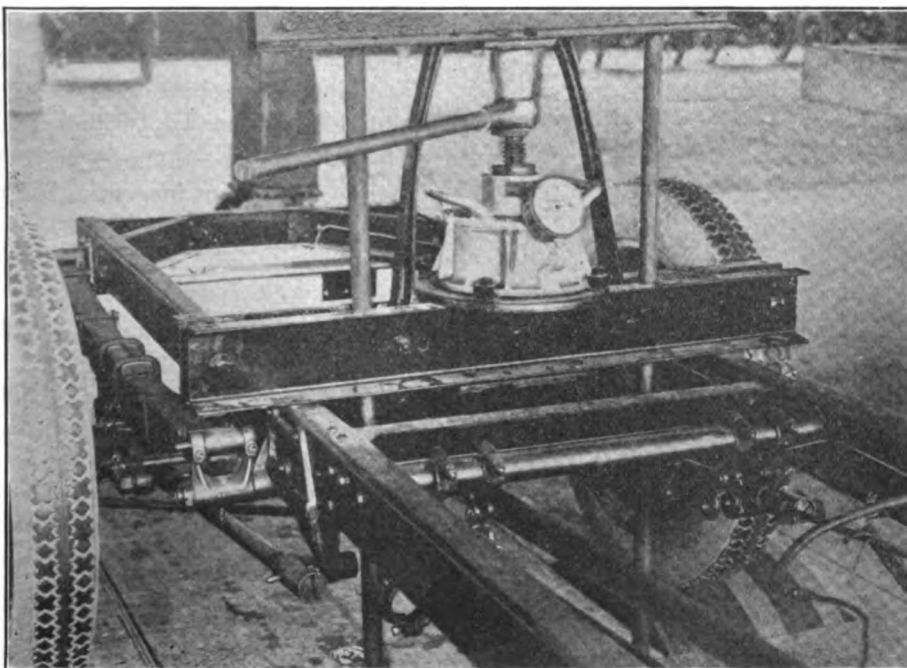
B. B. Backman, national president of the S. A. E., welcomed the production men to the meeting here and introduced Harold H. Emmons, who acted as toastmaster.

Among other men prominent in the automotive industry who sat at the speakers' table were Henry M. Leland, E. F. Roberts, vice president of the Packard Motor Car Company; W. L. Day, president of the General Motors Truck Company; David Beecroft, directing editor of Class Journal publications and former president of the S. A. E., and C. S. Mott, vice president of the General Motors Corporation.

H. C. Alden, vice president of the Timken-Detroit Axle Company, nominated for president of the S. A. E. for 1923, presided at the sessions Thursday and Friday mornings in the General Motors building.

The following addresses were made Friday morning: "Problems (Continued Third Column, Next Page.)

THE LOADOMETER



Photograph Shows How Loadometer Is Used in G. M. C. Test Plant.

Lubricating Oil Classification

PROPOSED changes in the classification of lubricating oil specifications were discussed at a joint meeting of the Interdepartmental Petroleum Specifications Committee, the advisory board to the committee, the Lubricants Division of the Society of Automotive Engineers, and the Technical Advisory Committee of the American Petroleum Institute, held in Washington, D. C., Nov. 13, at which N. A. C. Smith, petroleum chemist of the Bureau of Mines, presided.

Separate schemes for classification were presented by representatives of the Society of Automotive Engineers and by the Navy Department.

AFTER considerable discussion it was brought out that a difference exists between turbine oils for land service and turbine oils for marine service; also, that for turbine oils with paraffin base and asphalt base, lubricants seem to have the same effective viscosity at about 130 degrees Fahrenheit.

A special committee, composed of William S. James of the Bureau of Standards, Dr. T. G. Delbridge of the Atlantic Refining Company, and H. C. Mougey of the General Motors Research Corporation, which was appointed to consider a list of descriptive names to be used for lubricating oils in the federal specifications, for explanatory purposes only, reported a majority opinion that four names should be used together with descriptive numbers; light oil, to cover S. A. E. numbers 15 and 20; medium oil to cover numbers 30 and 40; heavy oil to cover number 50; extra heavy oil to cover 60, 80, 95 and 115. It was voted to accept this majority report as the sense of the meeting. A minority report, which follows the present classification adopted by the Navy Department, was also submitted.

The conference recommended the measurement of viscosities of oils up to 500 series at 100 degrees Fahrenheit; 600 series and higher at 210 degrees Fahrenheit.

It was further decided to request the interdepartmental committee to omit requirement for organic acidity from all motor oil specifications; also to make investigations into the relation between acidity, emulsion tests and service tests; also into the relation between oxidation and evaporation and service tests.

The conference also discussed color, carbon residue and pour test

requirements for lubricating oils and the fire point for mineral seal oil. The interdepartmental committee has taken all of these proposals under consideration and will take decisive action at a meeting to be held later.

The following named were present at the meeting: Dr. H. C. Dickinson, R. S. Burnett and W. E. Jominy of the Society of Automotive Engineers; Dr. Van H. Manning and Harmon F. Fisher, American Petroleum Institute; F. M. McGeary, J. G. O'Neill and Lieutenant Commander D. B. Downer, Navy Department; E. L. Lasier and George M. Talbot, United States Shipping Board; A. W. Herrington and L. J. Foley, U. S. A. Motor Transport office; J. T. B. Bowles and Byron D. Benson, Tidewater Oil Company; Dr. E. W. Dean and Roger Chew, Standard Oil Company of New Jersey; William S. James, W. H. Herschel and Dr. C. E. Waters, Bureau of Standards; W. E. Perdew, Union Petroleum Company; W. D. Reese, Fifth Avenue Coach Company; H. C. Mougey,

General Motors Research Corporation; Capt. Wm. H. Lee, War Department; Lieut. C. V. Haynes, supervisor lubrication, office Chief Air Service; W. A. E. Dowing, the Panama Canal; B. A. Anderton, Department of Agriculture; Dr. Charles K. Francis, Cosden & Co.; K. G. Mackenzie, the Texas Co.; H. A. S. Howarth, Advisory Board for American Society of Mechanical Engineers; Herbert Chase, Class Journal Company; E. B. Cranford, Postoffice Department; C. L. Stanton, Air Mail Service; G. A. Kramer, Shell Co. of California; F. E. Campbell, Associated Oil Co.; Dr. T. G. Delbridge, the Atlantic Refining Company; Dr. F. W. Lane, Bureau of Mines; D. P. Keeney, National Petroleum Association; J. W. Stack, Standard Oil Company of Indiana.

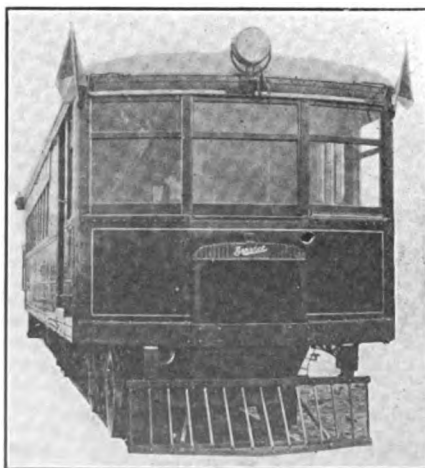
(Continued from Preceding Page.)

Met in the Production of Air-Cooled Engines," William Dunk; "Some Experience from a Production Notebook," H. J. Crain and J. Brodie; "Selection of Machine Tools," A. J. Baker; "Machine Tool Efficiency," R. K. Mitchell.

Friday afternoon inspection visits were made to the Cadillac Motor Car Company, the Packard Motor Car Company and Dodge Brothers factories, visitors going to any one of the three they preferred.

Thursday afternoon the whole body visited the Ford blast furnaces at River Rouge. Thursday morning E. Karl Wennerlund of the General Motors Corporation gave a talk on "The Group Bonus and Its Application," and P. E. Haglund, head of the Ford foundry at River Rouge gave an illustrated talk on "Cylinders from the Ore to Finished Part."

Service Rail Car



Front View of Service Rail Car Which Has Reduced Operating Expenses for Railroads.

Business Increases 20 Per Cent.

Reports of National Automobile Chamber of Commerce Indicate
Best Autumn Trade on Record—244,400 Cars and Trucks
Made in October—Motor Truck Market Active.

PRODUCTION of motor vehicles running 20 per cent. above September was reported to the directors' meeting of the National Automobile Chamber of Commerce in New York today (Nov. 1).

The total output for the entire industry for October, based on statements of shipments, is estimated at 244,400 cars and trucks.

The best previous October record was 200,000 in 1919.

INCREASED availability of coal, which was relatively scarce in September, largely accounts for the unusual October increase. The production of the latter month met a number of unfilled orders, as well as supplying October sales, which were

about 25 per cent. under September in most sections of the country. The fall months, though seasonally less than the summer, are expected to register the largest autumn trade.

Six states—Massachusetts, Ohio, Maine, Colorado, New York and

South Dakota report improvement in the movement of used cars. Shortage in freight transportation is maintaining the truck market at the September level with Massachusetts, Texas, Pennsylvania and Ohio showing increases.

Hinkley Replacement Plan

A RADICAL and highly progressive step in truck unit merchandising has been taken by Hinkley Motors, Incorporated, of Ecorse, which, while continuing to serve truck manufacturers as a source of engine supply, is also selling the Hinkley heavy-duty automotive engines which are its sole product, direct to fleet owners and individual truckmen on a replacement basis.

The Hinkley plan is a development of several

months of experiment, during which time its various details have been thoroughly tested and an organization formed which is now placing distributors in the trucking centers of the country.

Part of the plan is an exceedingly ingenious system of motor support with dimensions so flexible as to permit a Hinkley installation to be easily made in any truck of the front radiator type, regardless of the depth or width of frame.

"OUR plan is based on the radical fallacy which sets aside as worn out a truck, every part of which is thoroughly serviceable except the motor," declared Mr. Hinkley, in discussing his company's new policy.

"As a matter of fact, any good, heavy-duty truck should wear out at least three motors—in many cases four. And it should give fully as good satisfaction with each of the replacements as with the original motor. Such units as transmission, axles, frames, wheels and cab are virtually indestructible in such a vehicle, and encounter no strains or speeds comparable to that of the truck's engine.

"Replacement of an engine is just as logical as that of a tire.

"Another problem which our plan solves for the truck operator," con-

tinued Mr. Hinkley, "is the uncertain cost of major motor overhaul. We undertake this ourselves for all owners of Hinkley-motored trucks, shipping each replacement motor when his first Hinkley is ready for the shop. The truck owner is thus able to eliminate virtually all time loss, slipping the replacement engine into place, in a few hours. We have put motor overhaul on a production basis and have greatly reduced the cost of that operation, at the same time materially increasing the efficiency of the job. We accept any used Hinkley in need of overhaul as part payment for a rebuilt engine.

"Truck owners all over the country have been prompt in the support of this plan. More than one big fleet owner has assured us that our offer has stopped him from dis-

carding many or all of his motor trucks and going back to horses.

The addition of the replacement plan is also welcomed, Mr. Hinkley says, by the truck manufacturers using Hinkley heavy-duty automotive engines as standard equipment. Seventeen such manufacturers are listed in the current directories, among them several of the industry's leaders.

Replacement plan distributors, already placed, are announced by Sales Manager Charles A. Neville of the Hinkley forces, as follows: Buffalo, Standard Welding & Manufacturing Co., 1156 Main Street; New York City, Gorey Automotive Parts Company, 354 W. 50th Street; Pittsburgh, Parts Engineering Company, 3371 Bigelow Boulevard; Detroit, MacEwan & Shapley, 3169 E. Jefferson Avenue.

Conditions in Europe Affecting Foreign Trade

(Address by George A. Ranney, Treasurer, International Harvester Company.)

Delivered at 29th Annual Convention, National Association of Farm Equipment Manufacturers, Oct. 18, 1922.

IT IS not difficult to tell the members of the National Association of Farm Equipment Manufacturers what effect European conditions have had upon the foreign trade of our industry. All of you know in a general way that the effect has been distinctly adverse; some of you know it specifically and to your sorrow. It would be difficult to prophesy when these adverse conditions are going to change for the better, and I, for one, have not the courage to undertake the prophet's role. However, it may be helpful to at least review the present conditions and size up the obstacles that must be overcome before we can hope for any marked revival of foreign trade in our goods.

Foreign trade is often referred to with bated breath and as if some magic were needed to bring it forth. But there is, in truth, no mystery about it that the American business mind and business methods cannot dispel. Good business, like good common sense, speaks all languages. Distance, difference of laws and customs and an unfamiliar tongue raise up barriers, but these are more apparent than real. If there is any secret about foreign trade in farm equipment it is this—that the American exporter must adapt himself to the varying requirements of the foreign customer; that we must offer him what he wants and not what we want to take.

IT MAY be well at this point to draw an essential distinction between export business and foreign trade. Export business consists largely of selling goods to some exporter or importer on the basis of dollars f. o. b. American seaboard. Foreign trade in its higher and truer sense means the working up of a trade in a foreign country, with a sales organization competent to overcome the difficulties of unfamiliar ways and speech and to educate the customers in the use of unfamiliar goods. Many times the foreign trade also imposes upon the American manufacturer the necessity of trading in foreign monies—a difficulty not experienced, of course, by the exporter on a dollar-at-seaboard basis.

The world war furnished a great stimulus to Americans engaged in export business. This trade was largely in war munitions and supplies. It brought back vast sums, including large profits. But the war had no such effect on our foreign trade in farm equipment. If anything, it brought grief to our industry, due to the fact that it closed, or partially closed, some important world markets for our kind of goods.

The four chief elements necessary for successful trade anywhere are:

- (1) An article or commodity that the public wants or needs;
- (2) The ability to produce that article at a reasonable manufacturing cost;
- (3) An organization to successfully present it and its merits to the public; and
- (4) The financial ability of the consumer to buy.

The first three requisites are possessed in full measure by the members of this association.

Farm equipment is successfully manufactured in a number of foreign countries, but not in quantities or of a quality seriously to affect America's world supremacy in this department of foreign trade. There is no doubt that today the foreign farmer both needs and desires American made agricultural machines. There are as many acres available for the raising of crops as there were before the war and the need for the products

of these acres is as strong as it ever was.

In spite of the difference of wage scales here and abroad, and in spite of the distance the goods traveled, the experience and the facilities of the American manufacturer of farm equipment enabled him before the war to approach the foreign market on a profitable basis.

Nor is there any question about the specially developed and cultivated ability of the numerous American farm equipment manufacturers engaged in foreign trade to present their goods and their merits successfully in distant markets. I venture to say that in this respect the farm equipment industry need not fear comparison with any other American exporting industry.

So, then, we have for the foreign field a line of goods that is both needed and desired, the means of manufacturing them on a sound economic basis and the organization properly to present them. But when we come to the fourth element we come to the present trouble—the great and seemingly insurmountable trouble of the customer's financial inability to buy. Almost any barrier would be easier to get around or under or over than this. And we cannot consider this trouble in branch, trunk or root without coming at once to the grievous and perplexing questions of European finance and currency.

IS THE FARMER SOLD?

(Continued from Page 605.)

these horses and mules on these farms at the same time permitting them to greatly increase their business activities?

The foregoing charts 7 and 8 indicate the relative increase by years of the total number of the farm owned automobiles in the State of Nebraska. This indicates a very rapid and very substantial increase each year from the year 1910 to the year 1922 and must act, in part at least, for a portion of this horse replacement. The State of Nebraska is used for data on number of farm owned automobiles since it is the only state in

the Union from which we have been able to get similar data.

Chart No. 8 indicates the growth of automobiles in the United States. This speaks for itself and scarcely needs discussion.

Chart No. 9 indicates the growth of tractors on farms in Nebraska, Nebraska being used since it is the only state for which we could get comparative figures on farm owned tractors for these years.

To make the story complete, another curve should be drawn indicating the increase by years of farm owned trucks. This naturally will resemble, from line projection at least, the curve of the farm owned automobiles and tractors.

In concluding this analysis, I wish to present chart No. 10 since it is the only chart in which any way parallels the curves presented by the growth of farm owned automobiles, tractors and trucks. In chart No. 10 the curved line indicates the increase on farms in the State of Kansas of that class of horse flesh known as ponies, cripples and plugs. You will note that the number of horses and mules so classed has increased steadily. If this classification should be taken away from chart No. 3, indicating the total number of horses and mules over three years of age, it is readily apparent that the work stock on Kansas farms has decreased much more rapidly and to a greater extent than was indicated in the curve showing decreases of horses and mules over three years of age.

What does it mean? What of the future?

DURA COMPANY ENTERS INFRINGEMENT SUIT.

TOLEDO, O., Nov. 14.—Suit has been brought against Joseph N. Smith & Co. by the Dura Company, manufacturers of window regulators.

It is charged that the window regulator brought out by Joseph N. Smith & Company is an infringement upon the Dura company's patent rights.

Depreciation

(Address by T. F. Wharton, Secretary and Comptroller, Deere & Co., Moline, Ill., Delivered at 29th Annual Convention, National Association of Farm Equipment Manufacturers, Chicago, Ill., Oct. 19, 1922.)

LARGE amounts of capital are invested by farm equipment manufacturers in fixed assets, in the shape of land, buildings and machinery. This capital is just as solidly anchored as are the land and buildings and equipment in which it is invested. It cannot be turned over and reinvested, as can the capital which has been put into the factory products. But this capital can be conserved and saved to the investor and turned into profitable channels by the long-headed manufacturer who knows his costs and who insists on including in such costs all expenses necessary to main-

tain his plant in a high state of efficiency, and a reasonable allowance for the replacement of the plant. For it must be admitted that the buildings and all equipment will wear out some day, no matter how well they are maintained, and if the customers who use the factory products are not charged an amount large enough to provide for this plant deterioration, then beyond doubt the stockholders will have to be assessed for it some day, or the creditors will have to take over the business and reorganize it or close it out.

STOCKHOLDERS of a corporation are human beings, and as such are not averse to receiving dividends in liberal amounts and at frequent periods. In most cases they will ask no questions as to the source of dividends, but will assume that the business is being properly conducted and the dividends paid out of actual profits earned. This places the burden on the board of directors or the active managers of the business to see that the interests of the stockholders are protected and that they are not being repaid a portion of their capital in the form of dividends. Of course, if an organization expects to go out of business when its property wears out, it will be quite proper to distribute to the stockholders as dividends the amount ordinarily reservable for depreciation, but in that event the stockholders should be advised that it is a repayment of capital and not a distribution of profits. In the mining business this distribution of capital often takes place on the theory that by the time a mine is exhausted the stockholders should have repaid to them their entire investment.

In the farm equipment business, however, it is usually the intention of organizations to continue in business. Consequently, the stockholders should not have dividends paid to them out of the depreciation reserve, but should have their investment fully protected by the management. I think we will all admit the correctness of this statement, and yet we are inclined to view depreciation very much from the standpoint of its effect on profits. During a good year, and particularly during a period of high income taxes, we are inclined to be exceedingly liberal in our depreciation charges, and if we can get away with it, I think we are doing a good turn for the stockholders. During a bad year we study the depreciation question from a different point of view. We find many reasons for reducing the rate or for drawing upon the depreciation reserve created during the good years. We are also inclined to charge some of our maintenance expenses up to capital account and in that way show an apparent reduction in our operating costs. In the long run this sort of

a policy may work out all right, provided it is not repeated too often. If it is repeated too often it may result in the payment of excessive dividends and it may prove disastrous. * * *

How to Handle Depreciation Reserve.

There are two methods of handling depreciation on the books of an organization:

(1) By crediting the amount direct to the property accounts involved.

(2) By crediting the amount to a reserve for depreciation.

The first method always leaves the property accounts on the books at their present depreciated value. The second method leaves the property accounts on the books at their original cost. The second method is the better one for the reason that the books will then clearly show at all times the cost of property in use, while at the same time the depreciation reserve will reflect the depreciation in the value of this property. Under the second method, when any property is replaced, the cost of the old should be credited to the property account and charged to the reserve for depreciation. The cost of the new should be charged to the property account. This can be done where adequate records are kept of the costs of the various classes of property owned by the company. In case property is removed before full depreciation has been created for it, the difference between the amount of depreciation already provided, and the cost of the property removed, should be charged to the maintenance account for the year or direct to profit and loss, depending on the reason for the removal of the property. * * *

Methods of Computing Depreciation.

There are numerous ways of determining the proper amount of annual depreciation charges, but the three generally accepted methods are as follows:

1. The straight line method, or the charging of depreciation at a fixed amount per year over the estimated life of the asset. The depreciation in this case is based upon the original cost less the estimated salvage value.

2. The reducing balance method, or the method by which the depreciation

each year is based upon the depreciated value of the asset at the beginning of each year. In other words, this depreciation is credited against the asset account direct, and the amount charged each year is computed upon the remaining balance in the account.

3. The method of charging depreciation on the basis of the factory output. This method means that for each unit of production a certain amount of depreciation is charged.

The first method, that is, the straight line plan, is the one most generally followed. It is simple and easy of application and it charges the operations equally during the entire life of the asset with the expense caused by wear and tear and deterioration. This method more nearly reflects the actual invisible wear year by year during the life of a machine or a building.

The reducing value method is used by some corporations on the theory that this will produce a large fund during the early years in the life of a machine or an organization when it should be operating at its greatest efficiency and when costs should be at their lowest. The rate is also higher at a time when the maintenance charges are at their lowest. Later on, as maintenance charges increase, the amount of annual depreciation decreases and the plan serves as a sort of equalizer of the expense items for maintenance and depreciation. A comparison of the effect on the annual depreciation charge under the two plans is shown in the following table, where it is assumed the property will last for 25 years.

Years	Straight Line Method		Reducing Balance Method	
	Begin-Bal.	An. Rate	Bal.	An. Rate
1....	\$1000	.....	\$1000	.....
1....	960	\$40.00	831.76	\$168.24
2....	920	40.00	691.83	139.93
3....	880	40.00	575.44	116.39
4....	840	40.00	478.63	96.81
5....	800	40.00	398.11	80.52
6....	760	40.00	331.13	66.98
7....	720	40.00	275.42	55.71
8....	680	40.00	229.29	46.13
9....	640	40.00	190.71	38.58
10....	600	40.00	158.63	32.08

11....	560	40.00	131.94	26.69
12....	520	40.00	109.74	22.20
13....	480	40.00	91.28	18.46
14....	440	40.00	75.92	15.36
15....	400	40.00	63.14	12.78
16....	360	40.00	52.53	10.61
17....	320	40.00	43.69	8.84
18....	280	40.00	36.34	7.35
19....	240	40.00	30.22	6.12
20....	200	40.00	25.14	5.08
21....	160	40.00	20.91	4.23
22....	120	40.00	17.41	3.50
23....	80	40.00	14.48	2.93
24....	40	40.00	12.05	2.43
25....	..	40.00	10.01	2.04

It will be noted from the foregoing that the annual rate of depreciation under the straight line method is four per cent., while under the reducing balance method it is over 16 per cent., with over four times the total amount of depreciation the first year and only about 1/20 the last year. * * *

Rates of Depreciation.

For the purpose of depreciation, property should be roughly classified into several groups substantially as follows:

- (1) Land.
- (2) Buildings.
- (3) Machinery.
- (4) Small tools, patterns, jigs, dies, etc.
- (5) Furniture and fixtures.
- (6) Hauling equipment.

Land.

It is not customary to write off any depreciation on land, even though it may lose some of its value owing to the neighborhood in which a factory is located. Generally speaking, the government will not recognize any depreciation of this nature.

Buildings.

The rates of depreciation on buildings vary greatly with the nature of the construction. As a general rule most organizations figure a straight two per cent. on all buildings. If the structures are well built and well maintained this may be all right. For the general run of implement factories, with buildings properly classified, the rate would probably average 2½ per cent. In our own organization we have a record of the cost, or the appraised value prior to March 1, 1913, of all of our factory and branch house buildings. We have classified these buildings in accordance with the nature of their construction and have given each class an average life varying from 50 years for reinforced concrete buildings to five or 10 years for temporary structures.

We have divided the cost or the appraised value of each building by its length of life as estimated by us, and we write off annually the amount of depreciation thus obtained. We keep a record of the depreciation on each building and whenever the estimated life of the building has expired we discontinue any further depreciation on that building. No doubt reinforced concrete buildings are capable of lasting much longer than 50 years. We have made that the maximum of any building life, however, owing to the fact that changes in business conditions may render such buildings valueless by the end of 50 years.

Machinery.

It is impossible to establish an accurate rate of depreciation for machinery as a whole, for the reason that almost every machine constitutes a separate problem. A few organizations have their machines all classified and have a rate of depreciation for each machine. Most concerns, however, are not in position to do this and must depend upon a uniform rate for all machinery. We all have machines in our organizations which have been in use 20 years or more and are still giving good service. Most of us also have had machines which within a few years have been replaced by others, more particularly, however, on account of obsolescence or of change in manufacturing conditions.

I believe that the Treasury Department is quite willing to accept a rate of from five per cent. to 10 per cent. on machinery, and either rate can be justified by experience. As a general proposition conservative manufacturers will use the 10 per cent. rate, but any rate from five per cent. to 10 per cent. would be satisfactory.

Depreciation is considerably affected by the method of maintaining properties. If they are poorly maintained the depreciation will necessarily be higher than if they are kept in the best of condition. Depreciation is also effected by the efficiency of the workmen. A good workman will use intelligent judgment in caring for his machine and will considerably increase its life. A poor workman will pay no attention to his machine and the deterioration will be considerably increased. Here is where the factory manager can do something to reduce depreciation charges.

CHILE TAKING SLOWLY TO TRACTORS.

Rollo S. Smith, secretary to the American commercial attache at Santiago, Chile, in a report to the Department of Commerce, estimates that there are between 135 and 150 tractors in service in Chile at the present time. Most of them are of American origin. A few British "Austin" tractors are in use, and in addition there are agencies for the sale of the German "Lanz" tractor and the French "Renault" and the "Semua," but as yet they have found little sale. The average selling price for tractors in Chile is around 5000 to 5500 gold pesos (one gold peso equals 36.5 cents in American currency) for a 10-20 horsepower machine; 6800 to 7000 gold pesos for a 15-30 horsepower machine and 13,000 gold pesos for a 20-40 horsepower machine.

Although tractor agencies are in the hands of the largest and best equipped commercial houses in Chile, which have branches or connections in all the principal centers, success in the field has not been as encouraging as might have been expected, considering the number of tractor sales effected in the neighboring republic of Argentina. The agencies have made every effort through advertising and practical demonstrations to convince land owners of the utility and economic value of tractors, and the cause

of their limited success and the opposition encountered is difficult to define. One of the greatest difficulties has been found to be the ignorance of the average farm hand and his utter lack of mechanical aptitude. The unnecessary number of accidents and consequent delays and loss of time in farming operations through the use of power implements are undoubtedly due to the incapacity and carelessness of operators. Another natural factor creative of opposition to power farm equipment in Chile is the fact that an abundance of crops can be raised with a minimum of labor. Farm help, though inefficient, is cheap; the maintenance cost of oxen is insignificant, and the average farmer is satisfied with the results attained through the use of the facilities at hand and he is therefore loath to invest large sums in expensive machinery, of which he has very little working knowledge, and the use of which would entail large expenditures for fuel.

GREAT ROAD DEVELOPMENT IN WYOMING DURING SEVEN YEARS.

The last seven years have been a period of great road development in the State of Wyoming, according to figures collected by the Bureau of Public Roads of the United States Department of Agriculture. From 1914 to 1921 the total road mileage increased from 14,797 to 46,528 miles. This is in strong contrast to the majority of states, which have made great progress in road improvement, but without any appreciable change in total mileage.

During the seven-year period the mileage of improved road has increased from 1724 miles to 6867 miles. The mileage of road is classified as follows:

	Miles
Unimproved	39,373
Graded and drained.....	6,715
Gravel, chert, shale.....	413
Hard surfaced	27

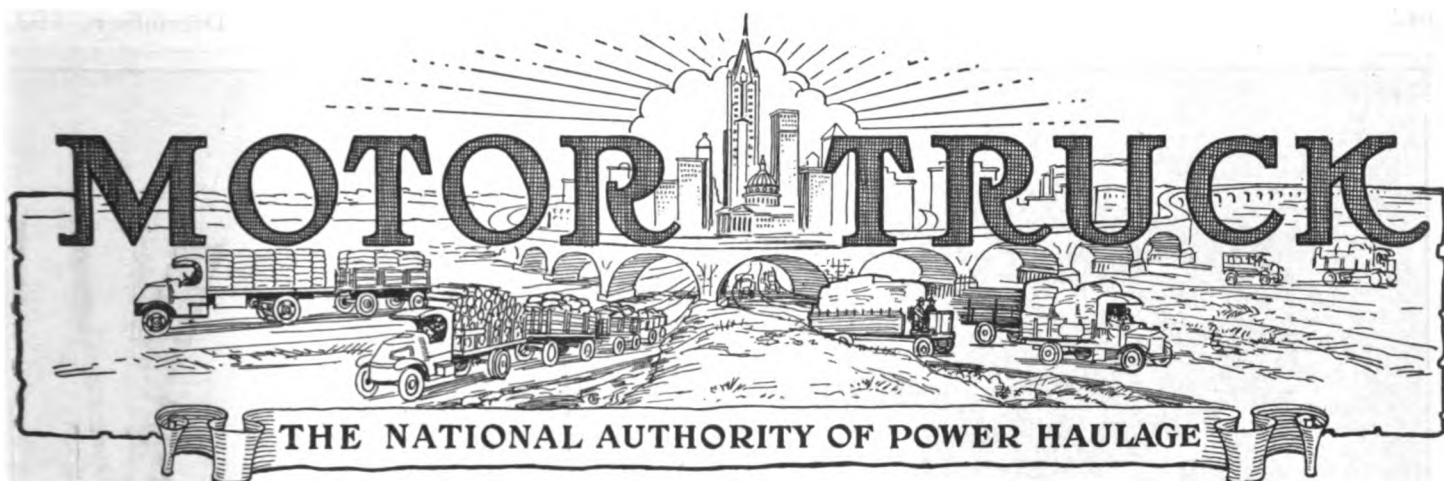
In the state there is a total of 613 highway bridges.

An analysis of the figures collected by the bureau shows that there is one-half mile of road per square mile of area; that the annual road revenue is \$55.32 per square mile, \$116.25 per mile of road, and \$27.82 per capita.

In 1921 the total road revenue, including federal aid funds, amounted to approximately \$5,408,000, and expenditures \$4,725,000. During the year 1673 miles of improved road were completed in the state and considerable maintenance work done.

That federal aid is playing a considerable part in road advancement in this state is shown by the fact that on Aug. 31, 474 miles of federal aid road had been completed, 421 miles were either under construction or approved for construction and nearly \$800,000 was available for new projects.

The state system of over 3000 miles of road to be built with federal aid and which will form a part of the federal aid highway system will be definitely settled upon within a short time.



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PAWTUCKET, R. I.

DECEMBER, 1922.

Motor Rail Car an Efficient Transportation Unit

Extensive Survey Which Proves Marked Economy and Excellent Service of Present Installations Also Brings Out Certain Objections to Existing Designs.

(By S. G. SWIFT.)

CONSIDERED wholly from the viewpoint of efficiency in doing the work for which it was designed is the motor rail car a success?

This writer is one of the many who believe that it is.

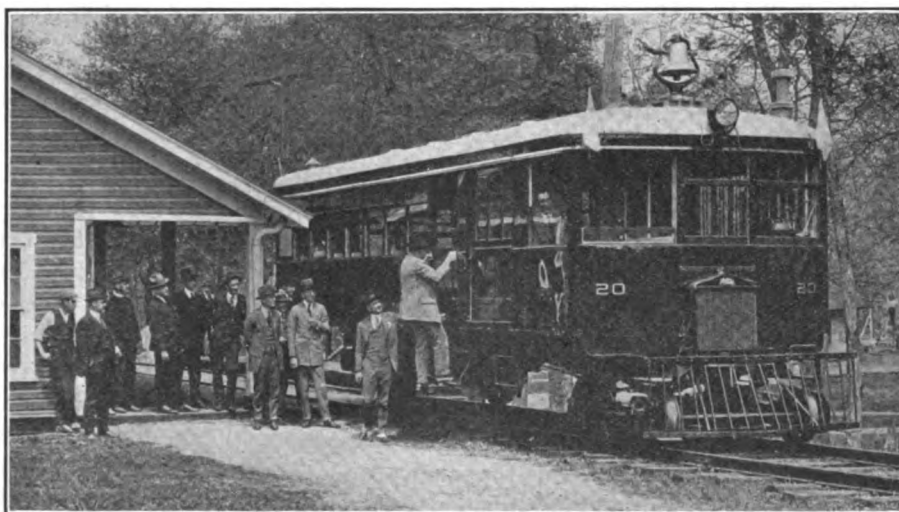
Certain self-constituted authorities, however, seemingly able to think of the rail car only in railroad terms and either governed by inherent prejudice or insidious influence, state that a rail car to suit the purpose is not yet available.

But they are wrong.

There is no better proof of the value of anything than that which is offered by material evidence and the actual facts in this case, as shown by the records of several hundred units installed within the last few years, overwhelmingly indicate the marked success of this type of vehicle.

WITHOUT going into too great detail let us cite but a few of the many examples which bear out this contention.

One of the first that occurs to mind is the case of a single installation of combination passenger and baggage rail car on the Pennsylvania and Atlantic Railroad, which is



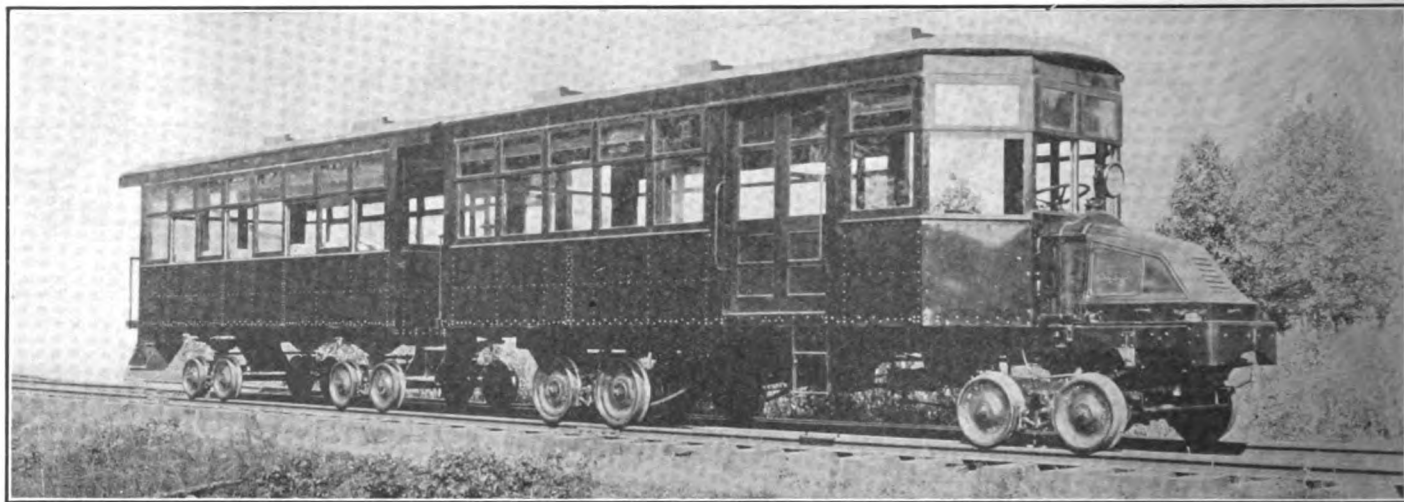
Passengers Speak Highly of the Service Given by This White Rail Bus, Which Is Operated by the Pennsylvania Railroad at Low Cost.

stated to be saving the company with the entire approval of the passengers. \$15,000 yearly and to be meeting

A similar unit used by a Tennessee railroad is rounding out its eighth year of service, during which time it has made round trips daily of 84 miles and brought the branch line on which it is operating from the red ink side of the ledger to a place where the passenger service has doubled and net

earnings are \$30 daily.

Another rail car used on the New



Kelly-Springfield Units Are Used in the Edwards Rail Bus for Which Marked Economy of Operation Is Claimed. The Trailer Principle Is Adopted in This Installation, Greatly Increasing Passenger Capacity.

Orleans and Lower Coast Railroad has effected a similar saving, while the New York, New Haven & Hartford has several units which have paid for themselves many times over and given service which is considered by passengers to be better than that offered by the average railroad. The writer several times has ridden on one of the New Haven rail cars and like many another who has made a trip in this efficient transportation unit, can testify to its entirely satisfactory service. Incidentally, it's always on time—something which cannot be said of the steam train of today.

Going further into the matter it may be stated that a member of the American Short Line Railroad Association reports more than 300,000 miles of service from a gasoline rail car which was operated at a cost of from 10 to 25 cents a mile with a total maintenance outlay of \$15 a month throughout its five years of service—and it's still rolling up the mileage. An executive of the association mentioned is authority for the statement that of the several rail cars offered for sale by members not a single one is of modern construction, but is of the old, heavy and obsolete type, which was put into service many years ago and in more ways than one was of purely experimental design.

The association also reports the highly successful operation of a light six-wheeled type of rail car approximately thirty-six feet in length

and weighing ten tons, which travels at a speed of thirty-five miles an hour on a gasoline consumption of between five and six miles to the gallon, and another forty-three feet long, having two four-wheeled trucks and a total weight of fifteen tons which, at forty miles an hour, has superior riding quality. Surely no passenger on a branch line railroad is in such a hurry that he would care to ride faster than this speed. If he should feel that the time made was somewhat slow he could never look to the modern railroad train to better it as the average steam train runs at speeds varying between twenty-five and forty miles an hour.

So much for this part of the story which offers irrefutable evidence to show that the rail car even in its present development is entirely successful.

Objections Cited by Railroaders.

In the light of the foregoing it is not thought necessary to detail at length the statements which this writer has heard mentioned as constituting pronounced objections to the rail car of present day design, although a brief summary of these points may be of interest. Many of these so-called objections are not worthy of comment and perhaps none of grave import. The one most often cited is that the capacity of the unit is not sufficiently large to take care of rush hour or seasonable traffic. The contention is made that the rail car, to be wholly efficient, should be so constructed that it

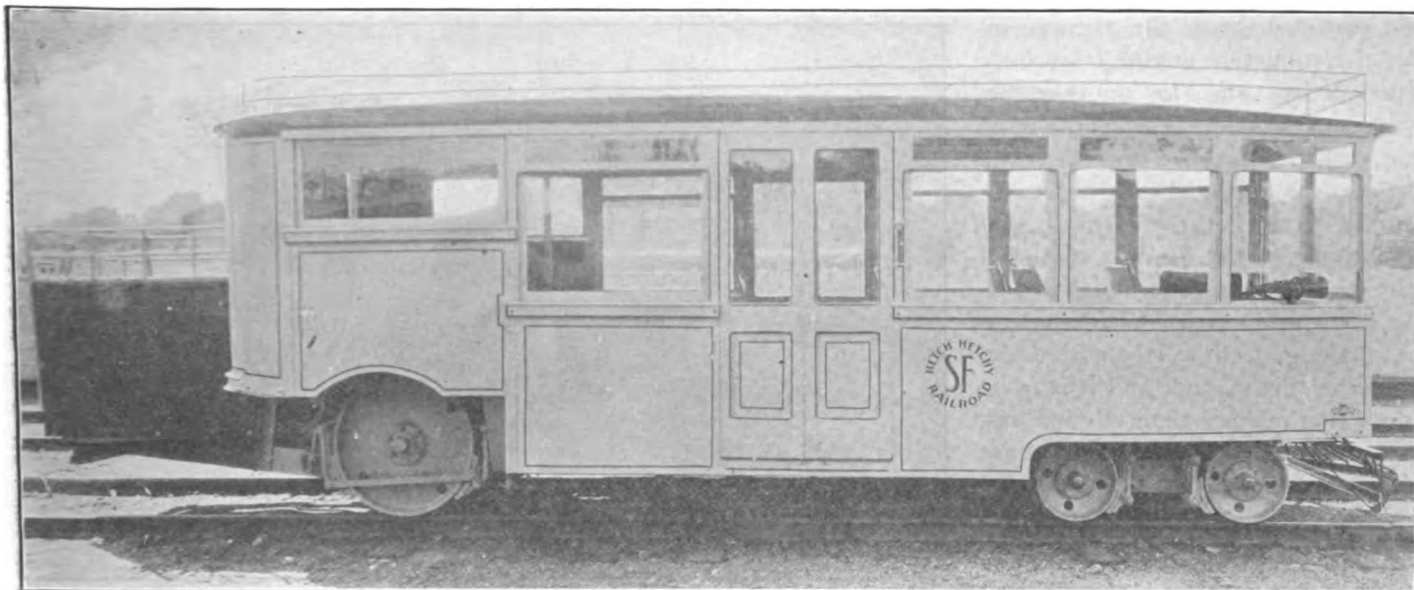
could handle at least double its capacity by the use of a trailer which would carry as many as could be accommodated in the car itself.

Patently this objection is ill advised and aims to defeat the purpose for which the rail car was designed; in fact, after due consideration of the statement one is almost tempted to suggest that objections of this kind border on insidious propaganda for the steam locomotive builders. The rail car was designed solely with the idea of giving to the railroads a light, serviceable and economical transportation unit which could be used on those branch lines the traffic on which would not admit of the use of a steam train with its high operating expense.

It is doing exactly what it was designed for and doing it well.

To this writer's way of thinking the dictates of economy forbid the use of the trailer, since in order to have an engine powerful enough to handle the trailer during the short periods when rush traffic might make its use feasible, it would have to be of a size that would in effect make for a wastage of power during the times when the car was running without a trailer. Having more power than necessary for the average load in order to take care of the occasional heavier one is one thing that has made the steam locomotive an expensive haulage unit and it is not believed that the motor rail bus should be developed along this line.

The minute we use a power plant



In This Newly Designed Rail Car the Hetch Hetchy Railroad Has an Economical and Comfortable Unit, Which Is Meeting with the Entire Satisfaction of the Many Patrons of the Road Who Make Daily Use of It.

larger than necessary to take care of our single car capacity we are adding expense of operation and thus defeating that purpose for which we are striving by limiting the area of the field which we may profitably serve. These cars are not expensive in a relative sense and it would seem that the best thing to do would be to forget about the trailer and to advocate the purchase of extra rail cars for use during rush periods, although it is possible that the builders may decide that the trailer principle is wholly practical, especially as there are a few installations which appear to be giving satisfaction.

Should Seek to Minimize Vibration.

Another objection—not borne out as the fact by this writer's experience, which admittedly has been limited—is that because the rail car power plant is self-contained and the car is an adaptation of a vehicle the springing of which was originally designed to work in connection with the pneumatic tire, the vibration is excessive. This statement at best is overdrawn, although certain railroad men seek to show that the passengers suffer discomfort because of this alleged excessive vibration, that the engine constantly requires repairs and that the life of the vehicle cannot be of a length economically commensurate with the cost of the installation—statements refuted by the facts in the case.

There is no evidence to prove that

an undue vibration exists in the rail car. This is borne out by the statements of those persons who make daily use of the vehicles, and from a mechanical standpoint, is proven by such concrete examples as the one mentioned of the vehicle which has rounded out more than 300,000 miles of service. It is quite obvious that the pneumatic tire aids materially in smoothing out the shocks incidental to operating on the modern highway and that this type of tire cannot be adapted to use on the steam rail. But is it necessary? Metal wheels on the highway would be out of the question due to the inequalities of surface, but they are entirely applicable for use on the railroad track with its relatively smooth, level surface—this with the possible exception of crossing over switches, which is a matter of small consideration.

Power Plant Not Flexible Enough.

Another objection which is advanced is that engine of the rail car is not flexible enough. The point is made that the change of speeds is too abrupt to admit of proper resilient operation and that due to its nature the engine cannot be loaded when coasting down grades of varying lengths which makes for passenger discomfort and the wear of reciprocating parts. The best answer to this is seen in the operation of the modern motor car on the highways; it is probable that this question has not occurred to one operator out of

a hundred and surely the engine of the rail car, running as it does on the smooth rail, cannot operate in a greatly different manner than that of the automobile on the highway.

So much for that, except as may be stated in all fairness that the transmission of nearly every gasoline vehicle offers a field for experimentation with a view to greater flexibility.

Double Power Unit Advocated.

Still another objection—and it can hardly be called such—is that the modern rail car must be shifted on a turntable at the end of the branch line, which would be unnecessary if there was a power unit at each end of the vehicle.

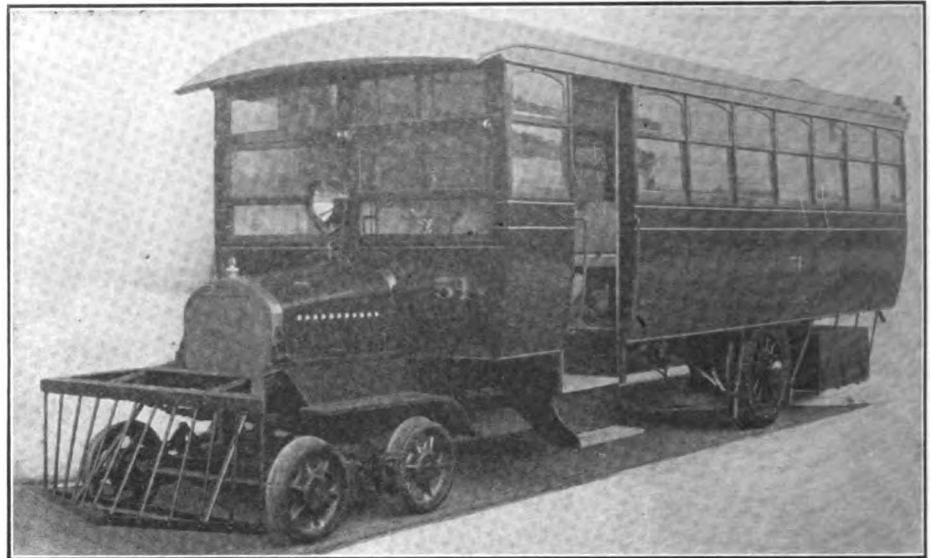
This might work to advantage, but here again we are getting away from the principle for which the rail car was designed and the purpose for which it was developed. The added expense of building a rail car with two power plants simply to do away with the work of turning it at the end of the run is not to be considered in the light of economy, especially since this turning can be accomplished by an inexpensive type of turntable or, failing this, by a few feet of track laid "Y" shape.

For the purpose of increased reliability it might be well enough to have an engine in either end of the car so that in the event of damage or accident to one, the other could be used, but this is unnecessary; for

one reason, because the average internal combustion engine is entirely trustworthy, and for another, because such practise is entirely out of line with the purpose for which the rail car was designed as it must materially increase the cost of the installation, thereby limiting to an extent its wide adoption and hampering mass production. We do not recall having seen a locomotive designed in this manner and it is to be hoped that makers generally will not pay marked attention to this phase of development.

Suggest Better Heating.

Another objection, and one which fundamentally is rather weak, has to do with the statement that exhaust gases when used for heating have to an extent proved unsatisfactory, as they enter the interior of the car, causing discomfort to passengers. The writer has never ridden on a rail car in winter, but has talked with several persons who have used the conveyance during the coldest weather and they report that no discomforts were noted, the interior of the car being much warmer and more comfortable than the average railway coach under the railroad management of the last few years. Objectors also state that these exhaust gases in summer are apt to come in through the open windows, though so far as can be learned the extent to which this is the fact is



The Northern Pacific Uses Mack Rail Cars Like the One Illustrated and According to Reports Finds Them Efficient.

wholly negligible and not worthy of discussion.

Wind Resistance.

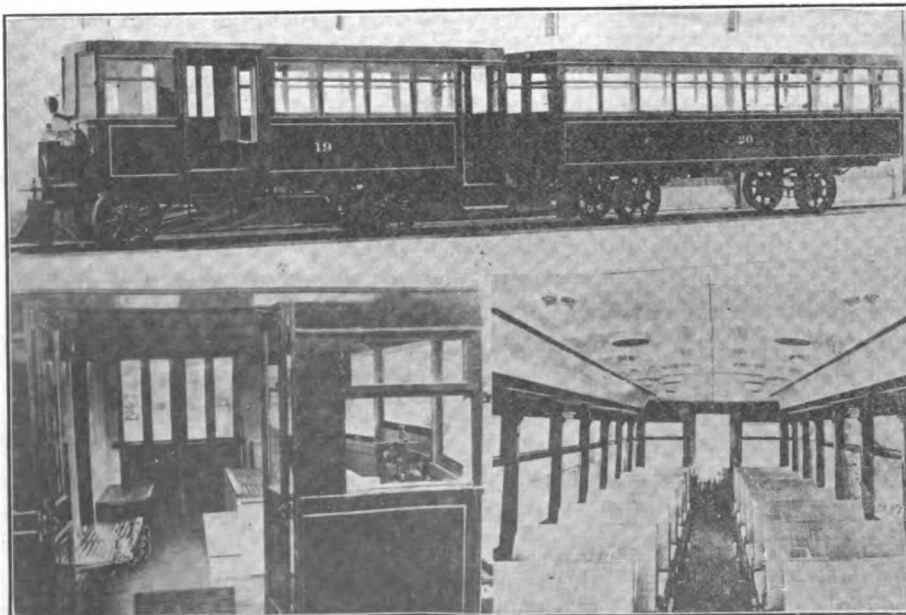
The question of wind resistance and its effect on the operating expense of the rail car has also come in for a certain amount of attention on the part of objectors, but this too is a phase of little consequence and one which is being taken care of in the newer installations.

From present indications it is quite obvious that the rail bus, quite like every new development, is feeling the influence of the already established principle which it seeks, even in a small measure to supplant. Just as the various associations

throughout the country whose members manufacture horse-drawn vehicles and implements have worked to hamper the progress of the vehicle propelled by the internal combustion engine, so those concerned with the steam locomotive, the passenger and freight car industry would seek to impede the development of the rail car since it encroaches on a territory which for many years has been peculiarly their own—a territory which due to their own lack of progress they are unable to handle in a manner sufficiently economical to admit of their continued usefulness in that field.

As a matter of fact it may be said that it is due to lack of progress on the part of the steam road equipment builders that the wide field has been opened to the rail bus.

Certainly the objections noted are rather unusual to come from those connected with the railroads when, as it is known to the average man, the modern steam locomotive is in effect the same today as it was thirty years ago, having gone through practically no developments which have made for increased efficiency. Despite the fact that coal, oil, wages and, in fact, everything in any way connected with the operation of the steam train has appreciated in value, locomotives and cars are exactly as inefficient as they were many years ago, a condition which, in the minds of many, accounts to a marked extent for the



Three Views of FWD Train on Cape Fear Railway; Another Traller Installation That Is Giving Satisfactory Service.

present poor financial health of nearly every railroad, just as it emphasizes an indifference to economic principles which has always been rightly attributed to that industry.

And yet it is apparent that builders of steam driven rail equipment would have the rail bus builder develop his product along railroad lines.

Rail Bus Primarily a Motor Car.

The motor rail bus is primarily a motor car and holds its place only through economy of operation which is exactly the reason why it should be developed along automotive lines—for the next few years at least. What the future will bring forth

sity of developing the vehicle along automotive lines.

Medium Sized Cars Most Efficient.

Even to attempt to set a standard for the passenger capacity, the weight and the speed limit of the rail bus is something which this writer does not feel qualified to do. He can, however, report the findings of those more competent through experience to judge of these important matters. The subject is much discussed, but the consensus of expert opinion seems to be that thus far a rail bus more than forty-five feet in length with a passenger capacity of more than forty to forty-five, a loaded weight of more than

degree will be defeating that purpose for which it originally was developed. Not only this, but the larger and the more intricate the unit the less readily it lends itself to quantity production—a matter of greatest importance to the automotive manufacturer.

It would be folly to come out with an optimistic statement to the effect that the rail bus in its present development is perfect. A statement of this kind would reflect either poor judgment or a desire to instigate insidious propaganda, which decidedly is not the purpose of this article.

Improvements Suggested.

The rail bus, considering the time in which it has been in use, has shown a development comparing favorably with the development of the automobile. But there are certain ways it can be improved.

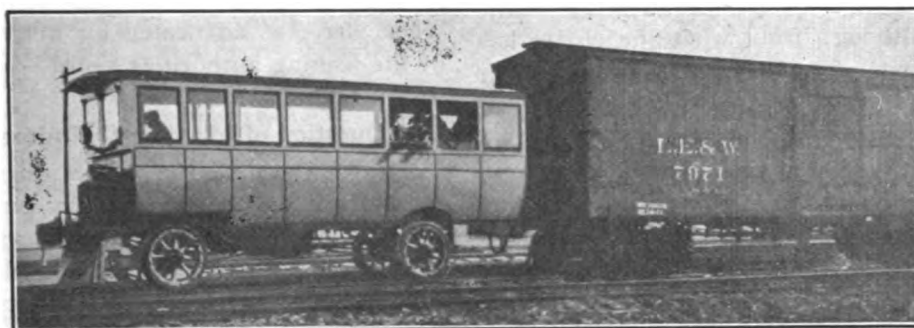
One of these would come from a complete interchangeability of parts—this for reasons which are obvious.

Then, too, it is quite possible that a more practical suspension of the engine might be effected, thus making for longer life of that unit and possibly minimizing the little vibration that occasionally is noted when changing speeds, crossing switches and running over uneven rails.

At least one body manufacturer has experimented for better body suspension with highly satisfactory results and others are giving the matter attention.

More Flexible Transmission Urged.

Also, and the statement as made

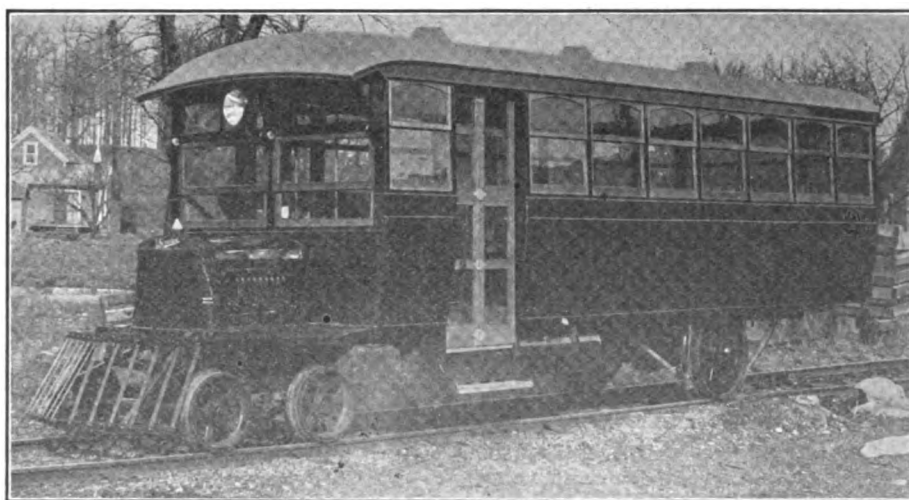


The Power of the Four Wheel Drive Is Shown by This Unit, Which Handles Heavy Freight Cars When Occasion Demands.

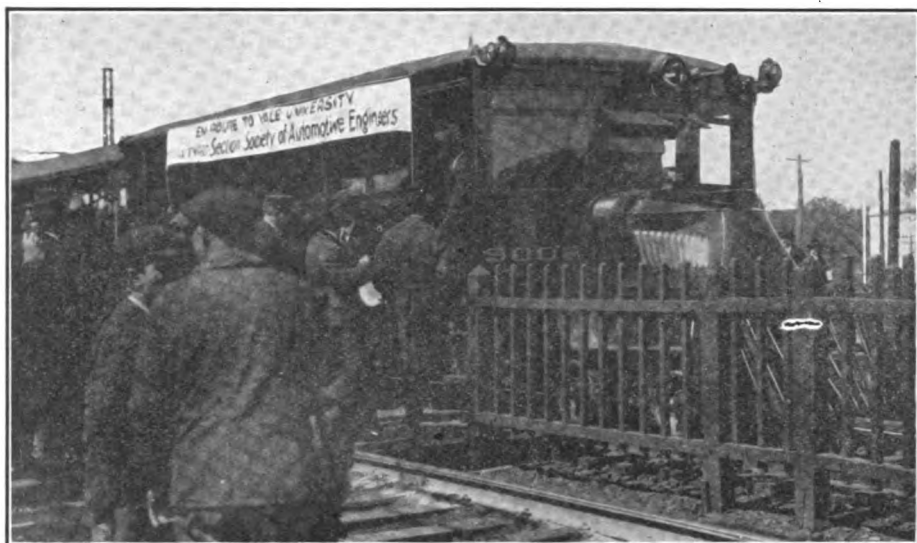
cannot at the present moment be forecast except in a very abstract and wholly unsatisfactory way. It is perhaps within the realms of possibility that within the next decade some sort of gasoline propelled train may be in use, but this is highly improbable. For the present the rail bus, properly to serve that field for which it was intended, should be nothing more than an adaptation of the highway motor bus and, rather than seeking to enter a field which at the present time seems closed to them, the manufacturers of these rail buses should bend every effort toward increasing the efficiency of the present design for the field in which it operates.

Experience has proven that the ideal rail car should be strong with minimum weight, of a medium size and so constructed as to deliver the maximum of efficiency and low priced service. The last phase is the most important, although the others are subordinate only in a minor way and all of them emphasize the neces-

sity of developing the vehicle along automotive lines. The subject is much discussed, but the consensus of expert opinion seems to be that thus far a rail bus more than forty-five feet in length with a passenger capacity of more than forty to forty-five, a loaded weight of more than



A Service Rail Bus, One of Many That Proves the Adaptability of the Internal Combustion Engine for Railroad Service.



New York, New Haven and Hartford Is a User of Rail Buses and Has Found Them Satisfactory in Lowering Operating Expense of Branch Lines.

is not intended as a reflection on existing methods, it would be essentially a forward step if an easier handled and more flexible transmission system could be developed. This might possibly be accomplished through a scientific application of the hydraulic principle or perhaps could be of electrical adaptation; the writer has no definite suggestions on this subject and merely offers the idea for what it may be worth. It is reported on good authority that certain improvements to this end are now being worked out, though any but the most meager details as to the present status of this development are lacking.

Without attempting to suggest in any regular order of their importance the several other improvements that a fairly close study of the subject has suggested, but merely taking each as it comes to mind, the next thing that may be mentioned has to do with designing the body along the lines of most economical operation, paying particular attention to the item of wind resistance. Practically no rail bus will ever be called on to travel at a rate exceeding 28 to 30 miles an hour, and it may seem as though there would be a little wind resistance at this speed. Actually it is negligible, but nevertheless accounts for a rather large total amount of fuel in the run of the year. For this reason it may be well to design the vehicle so that it will have a minimum wind resistance,

although from what the writer has been able to gather this question is not considered by designers to be of the utmost importance.

Could Enhance Heating System.

A few of the more modern rail buses have ideal heating arrangements. This perhaps should be credited to the heater manufacturers, many of whom have made extensive experiments to this end. The rail car builder, however, can enhance these heating qualities by properly insulating the body with whatever material is best fitted for that purpose, at the same time minimizing, and perhaps doing away entirely, with the unpleasant rumbling noise or "drumming" of the roof and sides of the car which has been noticed in certain installations.

Front Axle Drive Suggested.

Practically all, or to qualify the statement a bit, at least three-quarters of all the rail buses now in operation drive from the rear axle. The dictates of safety and (when one considers the length of the drive connection) efficiency as well, would seem to make it expedient that all cars drive from the front trucks, which preferably should be four-wheeled and pivotal.

It has been suggested also that there would be increased efficiency given through having all axles integral with the wheels, the entire unit turning through especially constructed journal boxes on frictionless bearings, but here again we are

starting to think in railroad terms and perhaps it is as well to continue the development along the original lines. Railroad men have brought up the point that the solid wheel and axle working through the frictionless bearing has always given maximum satisfaction on steam rolling stock, but on the other hand the car and truck maker can point to the success of his method over a period of years and since the rail car is primarily a motor car and not a unit of the steam train, it is probably better that its development be along motor vehicle lines. The writer believes, however, that on account of the length of the drive from the engine to the rear wheels, the front wheel drive as advocated by many of the leading authorities should be given serious consideration.

The Question of Multiple Cylinders.

At high speed, as the term applies to the rail car, the present day engine seems to be efficient enough. It is possible, however, that a multiple cylinder development, with its increased elasticity, might enhance the operation of the car at lower speeds, although from results obtained in the application of this system to the passenger automobile the contention seems not justified to an extent that makes it worthy of any special attention. It would perhaps admit of slightly smoother operation, though the rail cars in which this writer has ridden were of the four-cylinder type and they seemed to be flexible enough.

Better Cooling System Advocated.

Complaint has been made that because of the continuous fairly high speed at which the average rail car is operated, certain engines, due to the fact that they were adapted practically without change from the motor truck, are insufficiently cooled and here perhaps is a possibility for improvement that should not be overlooked. The average truck of course is rarely called on to operate in excess of eighteen to twenty miles an hour and even at that the speed for only short periods, therefore, a cooling system adequate for this class of work might be wholly unsatisfactory for the long sustained

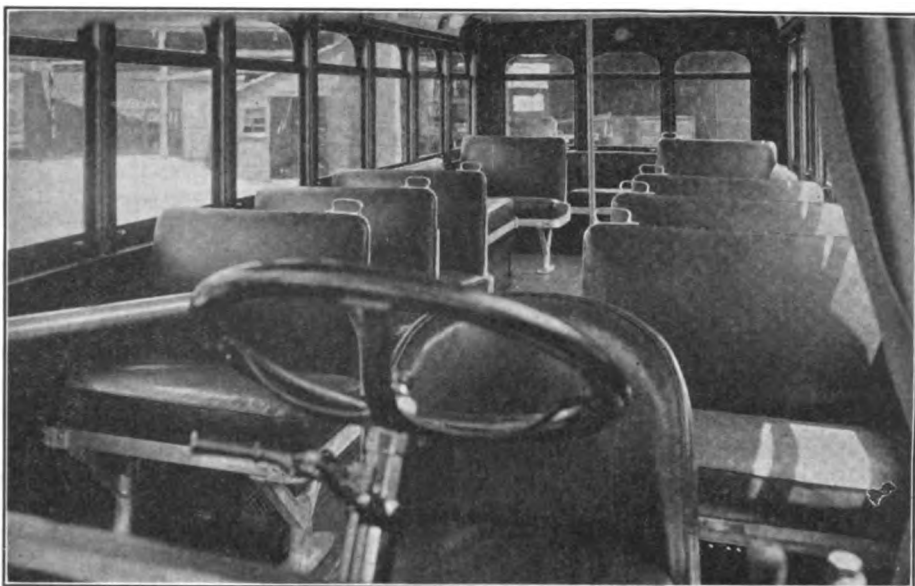
high speed at which the rail bus must be operated. The writer is of the opinion that this is an important point, and one of which cognizance should be taken by the builder.

It might also be worth while to look into the matter of clearance. A great many of the rail buses now in use, because of the fact that they were adapted from the motor truck, are entirely too high from the rails. Traveling over roads of all kinds, many of which were filled with obstructions, it was, of course, essential that the motor truck be constructed with clearance sufficient to admit of its operation over the worst of these roads. However, on the smooth steel rail, where no marked irregularities are encountered, such clearance is not necessary and from the viewpoint of increased efficiency through decreased wind resistance, as well as passenger comfort (upon which hinges the popularity of the rail bus) it would be well to have the vehicles as low hung as possible.

A great many of the older types of rail bus were entirely too heavy and it is believed that while this fault has been corrected in the more modern installations, there is yet room for improvement by the use of special alloy steels which will make the cars not only very strong, but of minimum weight, which will decrease the operating expense. As an example of this, one may cite the efficient operation of a recently developed forty-six-passenger rail bus, forty-two feet in length, which also carries baggage and weighs but $5\frac{1}{2}$ tons—truly a marked improvement over many of the early and more cumbersome models.

It also has been suggested that manufacturers experiment with spur gears instead of beveled gears and that they work toward finding a different method of installing them than is sometimes used. This, too, is given for what it is worth as careful inquiry seems to indicate that thus far the bevel gear has given very good satisfaction.

The foregoing suggestions are suggestions and nothing more as this writer does not care to be listed with those laymen who either through



Interior of a Modern Rail Car, Showing Luxurious Equipment That in Every Way Compares Favorably with That of Most Expensive Railroad Coach.

egotism or misdirected enthusiasm exercise a penchant for trying to tell others how they should do their work. They are points which have been picked up over a long period of rather painstaking study, however, and some of them may be of interest to men concerned in the development of the motor rail bus.

There is also another suggestion, however, and one which we believe to be a good one; it is this—that the manufacturers of the motor rail bus pay not too much attention to the railroad car builders standards and that they continue to think along

strictly automotive, rather than railroad lines, in developing their product. The motor rail bus, in order to accomplish that object for which it was originally planned, essentially a motor car, should be developed as such; otherwise, it will become nothing more nor less than a railroad locomotive propelled by gasoline—and thus automatically will hamper its own progress and lose that ground which has been gained. There is no reason why the manufacturer of the gasoline car should feel at all inclined to listen to advice of the builder of steam road equipment. There is nothing to show wherein these men have done anything great in the line of developing their products, whereas the history of the gasoline propelled vehicle records steady progress—a fact which to the writer's way of thinking makes it essential that the rail bus builder follow automotive practice.

BIG YEAR FOR MOTOR TRUCKS.

THAT the truck industry will completely recover from the last effects of the post-war depression in 1923 is confidently anticipated by the big men in the motor truck industry.

Motor truck manufacturers are preparing, practically without exception, for greatly enlarged production. The stabilizing influence of general business revival, restoring confidence among users of truck equipment, and ripening decision to purchase needed trucks and supplies, is creating a demand that will enable the truck industry in 1923 to operate at nearly full capacity.

Walter C. Robbins, who until recently was general manager for the Eberhart Steel Products Company, Buffalo, N. Y., is now president and general manager of the W. C. R. Engineering Company, also of Buffalo.

S. J. DeFrance has become junior aeronautical engineer with the National Advisory Committee for Aeronautics, Langley Field, Hampton, Va. He formerly attended the University of Michigan, Ann Arbor, Mich.

Glenn Weller has accepted a position with the Westinghouse Electric Products Company, Mansfield, O. He was formerly designer for the Ohio Brass Company, also at Mansfield.

Good Roads Congress to Meet in Chicago

Uniformity of Traffic Regulations to Be Among Subjects Discussed at Convention Which Will Be Attended by Thousands.

A MOVEMENT likely to result in the enactment of uniform highway traffic regulations throughout the country is expected to develop at the approaching Thirteenth American Good Roads Congress and Fourteenth Good Roads Exposition to be held Jan. 15 to 19 in Chicago under the auspices of the American Road Builders' Association. This subject is agitating the entire field of highway transportation and development at present and the indications are that it will be brought to a head through a proposal by President T. J. Wasser of the road builders' organization in his annual address Tuesday, Jan. 16. Mr. Wasser will propose joint action by the American Road Builders' Association, the American Society of Automotive Engineers, the American Automobile Association, the National Automobile Chamber of Commerce, the American Association of State Highway Officials and the United States Bureau of Public Roads and possibly other agencies, with a view to working out a solution of the question along national lines.

The subject of Mr. Wasser's address will be "Highways—Their Use and Abuse." The road builders' president will discuss such questions as a more adequate width for roadways, marking roads with direction signs and numbers, gasoline filling stations, the billboard nuisance and uniform traffic rules and restrictions. At present, according to Mr. Wasser, each of the forty-eight states is operating its highways independently of the others and there is much conflict and confusion.

"I want the American Road Builders' Association," said he, "to take the leadership in promoting interstate cooperation in securing better and more uniform traffic regulations and I am sure that we can or-

ganize a movement at Chicago that will sweep the country."

Eighty-five thousand invitations to the coming good roads congress have been sent to state, county and city officials, highway contractors, engineers and good roads advocates generally. The mayors of five thousand and American and Canadian cities and three thousand county boards of commissioners, selectmen, supervisors or freeholders have each been asked to appoint five official delegates to the congress. Each expo-

sition room has been applied for at the show to fill much more space than can be secured in the Chicago Coliseum and adjacent buildings. Excursion rates for the round trip to Chicago have been granted by all railroads.

During the congress, conventions will be held in Chicago by the Asphalt Association, the Midwest Section of the American Association of Engineers, the National Sand and Gravel Association, the National Crushed Stone Association, the Illi-

OFFICIAL PROGRAMME.

THIRTEENTH AMERICAN GOOD ROADS CONGRESS.

OPENING SESSION.

Tuesday Morning, Jan. 16, 10 A. M.

President's Address.

Greeting and Inspiration.

James H. MacDonald, Treasurer, American Road Builders' Association.

Continued Highway Expenditures Required to Meet Traffic Demands of the Future.

Thomas H. MacDonald, Chief, U. S. Bureau of Public Roads, Washington, D. C.

Progressive Construction of Highways.

- (a) Practise in North Carolina—By C. M. Upham, State Highway Engineer, North Carolina.
- (b) Practise in Iowa—By C. Coykendall, Assistant Chief Engineer, Iowa Highway Commission.

The Obligation of the State Highway Department to Keep the Public "Sold" on Highways.

H. E. Hilts, Acting Chief Engineer, Pennsylvania State Highway Department, Harrisburg, Pa.

DESIGN.

Tuesday Afternoon, Jan. 16, 2:30 P. M.

Chairman—Thomas H. MacDonald, Chief, U. S. Bureau of Public Roads.

What Test Roads Results Have Taught Us.

- (a) Bates Test Road, Clifford Older, State Highway Engineer of Illinois, Springfield, Ill.
- (b) Pittsburgh Test Road, Lloyd Aldrich, Consulting Engineer, San Francisco, Cal.

(c) Arlington Tests: A. T. Goldbeck, Engineer of Tests, Bureau of Public Roads, Washington, D. C.

Development of Apparatus for Field Testing of Roads.

H. F. Clemmer, Testing Engineer, Division of Highways, Springfield, Ill.

Developments in the Use of Local Materials.

Vernon M. Pierce, District Engineer, U. S. Bureau of Public Roads, Washington, D. C.

Designed Subgrade.

C. M. Upham, State Highway Engineer, Raleigh, N. C.

CONSTRUCTION.

Wednesday Morning, Jan. 17, 10 A. M.

Chairman—J. H. Cranford, President, Cranford Paving Company, Washington, D. C.

Haulage Methods in Highway Construction.

Industrial Railways: A. J. Parrish, General Contractor, Paris, Ill.

Heavy Truck Haulage: Charles H. Fry, Charles H. Fry Construction Co., Erie, Pa.

Light Truck Haulage: A. E. Horst, Henry W. Horst Co., Rock Island, Ill.

How to Equip and Operate Local Gravel Pit to Produce Concrete Aggregate.

H. E. Kuellnig, Construction Engineer, Wisconsin Highway Commission, Madison, Wis.

How Much Time Is Lost in Delays in Highway Building?

H. K. Davis, Chief Inspector, Iowa Highway Commission, Ames, Ia.

Discussions: B. H. Piepmeier, State Highway Engineer of Missouri, Jefferson City.

What Roadbuilding Work Can Be Done in Winter?

John H. Mullen, Chief Engineer, Minnesota Highway Department, St. Paul, Minn.

MAINTENANCE.

Thursday Morning, Jan. 18th, 10 A. M.

Chairman—A. R. Hirst, State Highway Engineer, Madison, Wis.

Organization of Intensive Maintenance on a State Highway System in Eighteen Months.

Frank Page, Chairman, North Carolina State Highway Commission, Raleigh, N. C.

Four Years' Experience with Patrol Maintenance in Wisconsin.

J. T. Donaghey, Maintenance Engineer, Wisconsin Highway Commission, Madison, Wis.

Gravel Road Maintenance Practise in Michigan.

L. H. Nielsen, Deputy State Highway Commissioner of Michigan, Lansing, Mich.

Blade Grader and Road Drag Earth-Road Maintenance in Iowa.

W. H. Root, Maintenance Engineer, Iowa State Highway Commission, Ames, Ia.

Salvaging and Maintenance Macadam Roads.

W. A. Van Duzer, Assistant Maintenance Engineer, Pennsylvania Highway Commission, Harrisburg, Pa.

Discussion: A. W. Muir, Superintendent of Maintenance, New Jersey Highway Commission, Trenton, N. J.

nois Highway Contractors' Association and the Illinois Association of General Contractors.

The entertainment to be provided during the week for delegates and visitors will include a stag party to be given Tuesday night, Jan. 16, by the exhibitors at the show, with orchestral music, songs, dancers and boxing contests. On Wednesday evening, Jan. 17, the annual banquet of the American Road Builders' Association will be held at the Congress Hotel. Men of national prominence will address the banquet and a high class musical and vaudeville programme will be rendered. On Thursday evening, Jan. 18, the American Road Builders' Association will entertain delegates and visitors with a dinner party at Terrace Garden, during the performance of "The Terrace Garden Review."

Convention and Show Committee.

C. M. Upham, Raleigh, N. C., chairman; T. J. Wasser, Trenton, N. J.; S. F. Beatty, Chicago, Ill., and James H. MacDonald, New Haven, Conn.

Banquet Committee.

J. R. Draney, New York City, chairman; J. F. McGurk, Chicago, Ill., vice chairman; I. J. Bransfield, Chicago, Ill.; A. J. Brehm, Cincinnati, O.; Frank B. Dunn, Conneaut, O.; William Howe, Chicago, Ill.; W. H. Kershaw, New York City; Claude King, Wilkes-Barre, Pa.; H. R. Kasson, Chicago, Ill.; Fred Lucke, Chicago, Ill.; Ed. Middleton, Chicago, Ill.; Charles Matteer, Chicago, Ill.; Robert McKay, Chicago, Ill.; W. J. Malatesta, Chicago, Ill.; W. H. Malone, Chicago, Ill.; John P. McGarry, Chicago, Ill.; Grant Osborne, Chicago, Ill.; W. W. Platzter, Chicago, Ill.; H. A. Royer, Chicago, Ill.; A. C. Sullivan, Chicago, Ill.; John Sullivan, Chicago, Ill.; Dyer Sackley, Chicago, Ill.; Ernest Stocking, Chicago, Ill.; William Sinck, Chicago, Ill.; W. H. Stone, Baltimore, Md.; R. B. Tyler, Louisville, Ky.; M. E. White, Chicago, Ill.; Bertram H. Wait, New York City, and Roger Williams, Chicago, Ill.

Publicity Committee.

S. T. Henry, New York City, chairman; J. E. Pennypacker, New

York City; C. R. Ege, Chicago, Ill.; M. O. Eldridge, Washington, D. C., and R. E. Brooks, New York City.

Entertainment Committee.

A. C. Cronkrite, Chicago, Ill., chairman; A. A. Ackley, Chicago, Ill.; James A. Alder, Chicago, Ill.; Charles J. Bennett, Hartford, Conn.; S. H. Bingham, Chicago, Ill.; F. P. Bowman, Chicago; J. P. Case, Chicago; R. B. Dickinson, Chicago; Thomas J. Hay, Chicago; J. L. Hecht, Chicago; U. J. Herrman, Chicago; G. E. Hillsman, Chicago; W. L. Hodgkins, Chicago; Samuel Irwin, Philadelphia; J. M. Kelley, Trenton, N. J.; E. J. Kilborn, Chicago; James Levy, Chicago; F. W. Lucke, Chicago; W. J. Malatesta, Chicago; J. J. McCarthy, Chicago; H. McKay, Chicago; E. L. Middleton, Chicago; A. C. O'Laughlin, Chicago; Grant Osborne, Chicago; R. B. Randall, Chicago; F. A. Reimer, Newark, N. J.; F. W. Renwick, Chicago; Henry Royer, Chicago; J. B. Sackley, Chicago; J. J. Sullivan, Chicago; L. N. Whitcraft, New York City; M. E. White, Chicago; F. V. Widger, Chicago, and M. J. Faherty, Chicago.

Reception and Hotel Committee.

(Honorary Members.) M. J. Faherty, Chicago; Charles C. Fitzmorris, Chicago; Clifford Older, Springfield, Ill.; C. R. Miller, Springfield, Ill.; George A. Quinlan, Chicago; Daniel Ryan, Chicago; Edward E. Gore, Chicago; John Bowman, Chicago; W. W. Baird, Chicago; Watson F. Blair, Chicago; W. E. Humphrey, Chicago; Homer Neize, Chicago; James C. Jeffrey, Chicago; A. M. Cornell, Chicago; Julius L. Hecht, Chicago; R. I. Randolph, Chicago; A. J. Hammond, Chicago; W. F. Lodge, Monticello, Ill.; Eugene R. Pike, Chicago; Christian C. Wiehe, Chicago; Si Mayer, Chicago; Herman Mack, Chicago; W. Frank McClure, Chicago; Charles M. Haynes, Chicago. (Active Members): R. F. Kelker, Chicago; K. A. McGuire, Chicago; Charles Wallace, Chicago; Harry A. Fox, Chicago; Barnard Dolan, Chicago; W. H. Myers, Chicago; Fred W. Hansen, Chicago; William G. Coats, Chicago; F. W. Locke, Chicago; C. E.

TRAFFIC.

Thursday Afternoon, Jan. 18, 2:30 P. M.

Chairman—Thomas J. Wasser, State Highway Engineer, N. J.
Tourist Traffic as a Factor in Highway Development (Illustrated).

A. R. Hirst, State Highway Engineer of Wisconsin, Madison, Wis.

Changes Needed in Motor Vehicle Legislation and License Fees.

J. N. Mackall, Commissioner of Roads, Baltimore, Md.

Discussion: Leon C. Herrick, Director of Highways and Public Works, Columbus, O.

Harry Meixell, Jr., New York, National Automobile Chamber of Commerce.

Election of Officers.

Business Meeting.

FINANCE AND MISCELLANEOUS.

Friday Morning, Jan. 19, 10 A. M.

Chairman—Frank Page, Highway Commissioner of North Carolina.

Have Large Expenditures Changed the Public Attitude Toward Highway Development?

S. E. Brandt, Former Superintendent of Highways of Illinois.

Cooperation Between State and County Highway Department.

L. C. Herrick, Director of Highways and Public Works, Columbus, O.

How Individual Organizations Can Fit Their Work Into the Broad Highway Research Programme.

W. K. Hatt, Director Highway Research Committee, National Research Council, Washington, D. C.

Mateer, Chicago, and J. E. Black, Chicago.

Registration Committee.

Lewis S. Louer, Chicago, chairman; Ezra W. Clark, Chicago, and Louis McLouth, Chicago.

Exhibitors' Committee.

C. R. Ege, Chicago, Ill., chairman; H. R. Snow, Chicago, Ill.; C. N. Leet, Milwaukee, Wis.

Chicago Press Committee.

Wallace R. Harris, Chicago, Ill., chairman; Louis McLouth, Chicago, Ill.; L. C. Murdock, Chicago, Ill.

Programme Committee.

E. J. Mehren, New York City, chairman; C. S. Hill, New York City; L. C. Herrick, Columbus, O.; F. T. Sheets, Springfield, Ill.; H. H. Wilson, Muncie, Pa.

Transportation Committee.

Royal N. Allen, Chicago, Ill., chairman; John L. Ferguson, Chicago, Ill.; John H. Cook, Chicago, Ill.

Director of Exhibits—C. W. Kelly, Chicago, Ill.

Director of Publicity—Clifford Spurrier Lee, New York City; assistant, Walter A. Bermingham, Chicago, Ill.

SELDEN MOVES BUSINESS OFFICES TO PLANT.

ROCHESTER, N. Y., Dec. 9.—Officers of the Selden Truck Corporation, a part of the Industrial Motors Corporation of this city, have been moved to the factory from their former location in the downtown section, where they were housed in an office building on East avenue. The company states that the move is made in line with its present policy.

As in the past the sales division of the Motor Corporation of the Selden Atlas Company will be under the supervision of H. T. Boulden as director. The Atlas truck will continue to be built at York, Pa., with Allen R. Cosgrove as general manager.

At the present time G. C. Gordon continues as president of Selden until Dec. 4, at which time new officers will be elected. J. J. Watson, Jr., is president of Industrial Motors.

White Moves to New Chicago Home



New White Service Station Which Is One of Most Modern in Entire Country. It Is Centrally Located for the Convenience of Patrons and Is Equipped with the Very Latest Type of Labor Saving Machinery.

THE Chicago branch of the White Company is now occupying its new service station recently erected at Archer avenue, Wallace street and Twenty-fourth place. The removal from the old quarters in Wabash and Michigan avenues took place the middle of November and was somewhat of a feat inasmuch as the entire equipment of service station and offices was transferred without affecting the availability of service to truck owners. The removal involved the handling of more than 10,000 different items.

THE new service station is a model one and one of most complete truck servicing plants to be found in the country. Built of concrete, brick and steel, with 55,000 square feet of floor space, it is largely a one-floor plant, and nearly all of the space is devoted to service work. A small section of the building on the northern corner has two stories, housing the sales, executive and clerical offices.

An important feature of the plant is the lighting arrangement. A large part of the wall areas on the four sides of the building are used for windows of the studio type. Through these windows and through the windows in the saw-tooth roof, daylight searches every corner of the shop, parts department, storage and office space.

vey of truck density. By mapping

The site of the new service station was chosen after a careful sur-



Studio Type Windows and Special Roof Construction Give Splendid Light.

the location of all White trucks now in service and studying the thoroughfares most frequently used, it was found that the Archer avenue location is almost in the exact "center of accessibility."



View of Stock Room, New Chicago Service Station of the White Company.

If all trucks were to start for the service station simultaneously, they would travel the least distance and consume the least amount of time in going to the new location. When the Canal street improvements are

completed they will give the service station a still greater advantage in location. Trucks can move to the station from the North Side without hindrance of loop congestion and can move to or from the loop without encountering the congestion of Wabash avenue and State street.

Another advantage is its "island position"—the total absence of abutting buildings. It is bounded by three city streets and an alley. The vehicle doorways are wide and high enough to admit the largest trucks in service. The interior dimensions are such as to permit the utmost freedom of movement.

Service Manager J. T. Swigart said that plans had been made to highly develop the maintenance work in step with the growing distribution of the company's product. This will be done not through space expansion alone, but through compact operations involving new time-saving methods and improved mechanical layouts. The company expects to do service work in much less time than is normally required.

White owners in Chicago who have visited the plant are loud in their praises and state that it offers the best facilities for real service that they have seen. Incidentally, it may be stated that there are a great many White trucks used in Chicago.

Newell Lyon is manager of the Chicago district of the company.

PERTINENT POINTED

THE NECESSITY FOR ORGANIZATION.

“FABLES from the Chinese,” a book published nearly a hundred years ago, recounts a story with which, in one form or another, we are all familiar. In this version an old Mandarin is getting ready to cash in his chips after an honorable and presumably busy life in which he has risen from a poor boatman to a wealthy tea merchant. His several sons are gathered around the teakwood couch on which he reclines. Calling to the oldest he requests him to bring a bundle of twigs from the moon-tree near the lagoon. The twigs are brought and laid beside the couch. The old Chinese then bids the son break one of them. Wondering at the unusual request the son obeys. The father then bids him break two at once and he does. Three at a time and even four and five the youth breaks, but six he cannot; twist and bend them as he will the tough fibers resist every effort.

The old man looks on, a smile lighting up his wan countenance.

“That is one of the big things I have learned in my journey through this world,” he says—“a part of the philosophy of life which has been thrust upon my dull and uncomprehending mind—the strength of organization. One of you alone can do little, two not much more, but six of you, working together, can build this business I have started till it will be the greatest in the kingdom.”

The motor truck industry, compared with certain others, is not yet well organized. This, in all probability is mainly because of its recent inception. Hardly two decades have elapsed since the commercial vehicle first came into existence and it is only within the last ten years that it has become recognized as a real factor in economical transportation; thus its sponsors, busily engaged in perfecting it, have hardly had the time to organize as have those in certain other industries. Although much has been done there is still a long way to go and it is to be hoped that 1923 will see more accomplished, especially with regard to the curbing of restrictive legislation.

This is a serious matter and one which merits the attention of every person interested in the advancement of the industry. It is worthy of special attention at this time, when inimical interests representing industries long established are

quietly preparing still further to restrict the development of the motor truck by measures which, if we read present indications rightly, will be offered to the state and city lawmakers after the way has been paved for their passage.

In many states and municipalities the commercial vehicle and the motor bus are meeting with strongly organized efforts to dislodge them entirely or to restrict their usefulness and in several cases the buses have wholly lost out, thanks to what appears to be the insidious influence of the traction companies on legislators amenable to the arguments used to gain their favor. This fact should be of especial interest to the manufacturer of this type of vehicle as it is becoming the strongest sales resistance he has to combat; a man thinks twice before he puts his money into a proposition that is illegal in a neighboring city or state and may at any time become such in his own.

To digress from the main theme for the moment and to cite an instance that shows the way in which such legislation works to slow up sales, the writer knows of a sale of several buses that was lost in a Massachusetts city because of the passage of a law that made it illegal to operate buses in the neighboring State of Rhode Island. The prospective purchaser had made arrangements for a close corporation to engage in the business of transporting passengers in what appeared to be a productive territory and, after a careful study of the situation, had even gone as far as to map out his routes. He had decided on the make of bus which he considered best adapted to the work and had practically placed the order when the law was passed in Rhode Island which restrained bus owners in that state from doing further business, as a result of which the Massachusetts man, becoming thoughtful, called off his plans and a salesman who had been sure of selling five buses sold none.

This is one of many instances that shows the need for the motor truck interests to organize; it is probable that buses still would be running in Rhode Island had their operators been organized with the backing of an organization of manufacturers. The people liked them, they gave good service and were an asset to the transportation

COMMENT OF THE DAY

service of the state, yet when the time came for them to go, they went; not without a semblance of a struggle perhaps, but they were disposed of easily enough.

There is much talk, these days, of cooperation between passenger and freight trucks, and the railroads. This is bunk for the most part and is born of no altruistic motive. What it actually means, if one is to judge by what has been done, is the limiting of the field for the motor truck and bus—simply this and nothing more. It should be obvious to the thinking man that the various traction interests have no love for the motor vehicle and that any "cooperation" which could be expected from this source would be calculated to give railroads the best of the bargain.

In the last few years there has been a lot of destructive propaganda leveled against the commercial vehicle and there is every reason to believe that the next year will see an open effort on the part of the several hostile factions to make conditions still worse for the industry.

We think that our powers of perspicacity are up to the average—nothing has occurred to make us believe that we have more than our share of acuteness, however, and for this reason we feel sure that many others beside ourselves have noticed the large amount of more or less cleverly veiled propaganda against the motor truck which has been published within the last few weeks. These articles, the most flagrant of which was given space beneath the signature of a reputable writer, in one of the largest magazines, ostensibly gives a world of credit to the motor truck, but careful reading shows that they are skillfully put together with a view to leaving the writer with the unconscious feeling that the commercial vehicle, economically, can do only such work as formerly was done by the horse-drawn vehicle, that its field is limited to being a "feeder" for the railroads and that it destroys the roads in a manner all out of proportion to the tax it pays. The source from which such deceptive writings emanate, as well as the negative impression they seek to disseminate, must be obvious to the thinking person—but to the thousands who "think" through the printed word of another, regardless of whom he may be and what his aim, such insidious propaganda is accepted as truth, its effect

enhanced through the fact of the unconscious impression which it makes on the one who reads it.

A lot more might be said on the necessity of organizing to combat insidious influences that stop at nothing to gain their ends. It is time for action right now and we sincerely hope that the leaders of the industry will plan immediately to take the steps necessary to round out the organization of the motor truck interests into a body that will be prepared in every way successfully to combat all measures that would limit the field of the truck or bus.

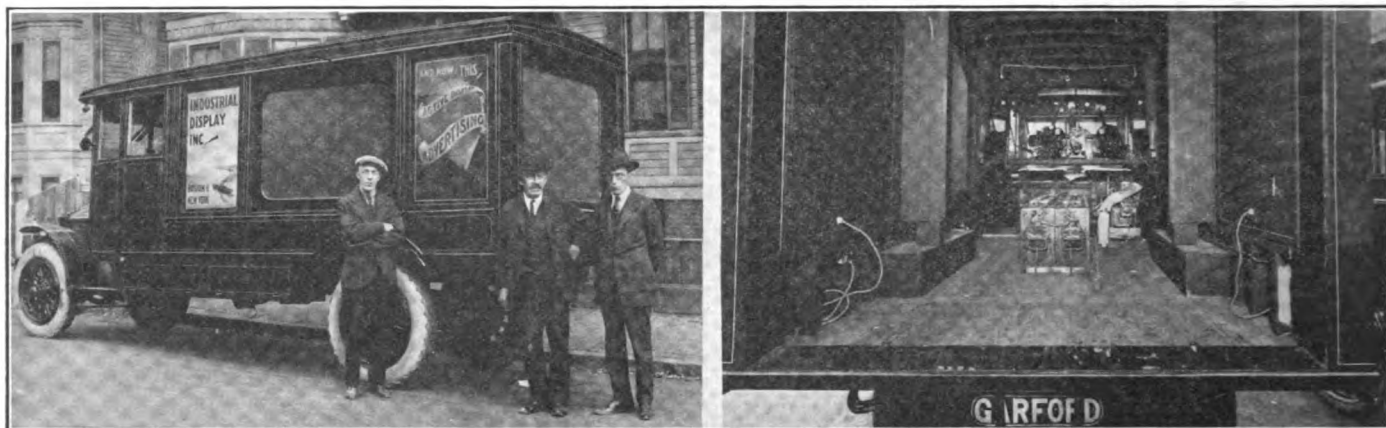
A WORD ABOUT PRICES.

"DAY by day in every way" business is getting better and better, and as we reach up to tear the last lone leaf from the calendar we may congratulate ourselves that with the automotive industry this is especially true. Every business has had its ups and downs during the last two years, but better times are quite obviously at hand, and the new year will come in, bringing with it every indication of prosperity.

A year ago the wave of car price cutting seriously slowed up sales of both automobiles and trucks. Prospective purchasers who had been practically ready to sign held off in the belief that prices would go lower and the result was seen in thousands of delayed sales. Today the buying public quite generally believes that prices are fairly well stabilized and for the sake of prosperity it is to be hoped that any price changes will be upward—the result will be reflected in increased sales. We have before us a list which shows that one manufacturer of automobiles and trucks, in the parlance of the street, is earning \$5 and paying \$2; another earning \$4 and paying \$1; the list is long and proves that many are prosperous; nevertheless, with nearly everything else appreciating in price it would be folly to think of lower prices for motor vehicles and it is our belief that a cut would invite disaster, as it would be the cause of more delayed sales.

From an analysis of the most authentic information obtainable it does not appear that lower prices are contemplated by the manufacturers; certainly they are not warranted by present conditions, all of which indicate an upward trend.

Truck Houses Motion Picture Show



Still Another Use for the Motor Truck Has Been Found by This Wide-Awake Advertising Concern.

INDUSTRIAL Displays, Incorporated, of New York and Boston, has succeeded in adapting motion picture advertising to the outdoors by means of a truck and a specially designed apparatus which shows the films in three places at the same time—on both sides of the truck and in the rear.

PANELS on the sides and one in the rear are the "screens" of this traveling picture show. Properly illuminated, and with the "show" in progress, crowds gather at any street corner where a "performance" is being staged.

This is one of the most interesting

combinations of the motion picture and the truck that has been perfected.

There is a thirty-two-volt, 250-ampere storage battery, charged by a two kilowatt universal motor generator. Two hours of daily running are required to charge the battery for a five-hour operation of the show at night.

The three displays of the films at three different points at the same time is attained by means of a triple projector feeding automatically. Due to the ample radiator capacity of the Garford truck in which the "show" is mounted the generating plant is efficiently cooled; this saved the ne-

cessity of a separate cooling plant.

Much ground is covered by this movie-truck show. This facility of movement is one of the chief advantages of this new idea in advertising. The entire outfit, storage battery, motion picture machine and the control of these devices, is mounted inside the truck closed body. In any weather this "show" can pick up and move along to its next scheduled stop without difficulty. The total mileage in a season will be high. The exhibitor has adopted model 725 Garford, with its 168-inch wheel-base, as the standard truck unit for this newer form of motion picture entertainment.

Flint Perfects New Axle

FLint Motor Axle Company, has brought out a new type motor bus and one-ton speed truck axle of the spiral bevel type, the pinion shaft of which is supported by ball bearings on both sides of the pinion.

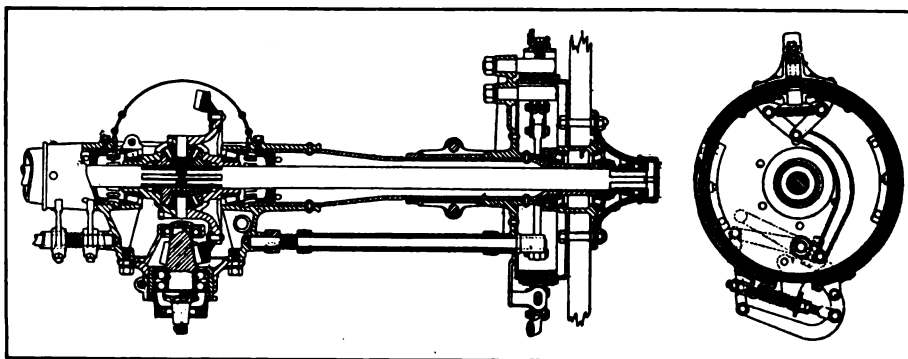
There are six roller bearings on the two main shafts; the shaft is splined on both ends and the hub has a pressed fit, the side gear and differential sliding on the spline.

The center housing, made of malleable iron, is cast in one piece, the hole for the axle tubes being bored to the same diameter as that required for the bearings on the side of the differentials, which tends toward operating economy and permits of lower priced manufacture,

without in any way detracting from the efficient performance of the unit.

Main tubes, which taper down to

to carry a maximum load of two 3135 S. A. E. The axle is designed tons, the corresponding front axle



Operation of Truck and Bus Is Enhanced by the Efficient Flint Axle.

three inches at the spring support, are made of 30-40 carbon steel. The axle main shafts are 1½ inches in diameter and built of steel number

having a load carrying capacity of 1400 to 2200 pounds. The axle can be furnished with torque arm or as Hotchkiss drive type.

Cleveland Pneumatic Tool Company Builds Gruss Air Springs

World-Known Manufacturer Long a Producer of Superior
Pneumatic Equipment Enters Automotive Field with
Shock Absorber of Unusual Merit.

(By S. G. SWIFT.)

THE recent acquisition of the manufacturing and sales rights on the Gruss Air Spring, a pneumatic shock absorber, by the Cleveland Pneumatic Tool Company, Cleveland, brings into the automotive equipment field one of the largest concerns of its kind in the world.

The Gruss Air Spring, a shock absorber of an entirely different type from any other now on the market, has been produced for some years by the Pneumatic Cushion Company of San Francisco and has met with high favor on the Pacific coast. There it is in use on thousands of passenger cars of all weights and has been adopted as standard equipment by the big coast truck fleets of the Standard Oil Company, Union Oil Company and practically all of the many bus lines plying through that part of the country.

The decisive entrance into the automotive industry of The Cleveland Pneumatic Tool Company, with its quarter-century of experience, its large organization, its world-wide market affiliations and ample capitalization, is of signal importance to the automotive industry as a whole.

THE Cleveland Pneumatic Tool Company is as thorough in its business methods as it is in its manufacturing practices and the decision to manufacture the Gruss Air Spring came as no sudden resolve. The first thing the company did when it had decided to investigate the possibilities of producing the device was to engage the services of J. F. Wallace, S. A. E., a prominent engineer identified for many years with the Haynes Automobile Company who, by reason of his long experience and special knowledge, was peculiarly fitted to conduct the one and one-half years of experimenting with the spring which was undertaken by the company.

The series of tests carried out by Mr. Wallace were as thorough as it was possible for them to be and included work with the smallest of

passenger cars as well as the largest of heavily loaded motor trucks. The experiments were considered necessary because the company, feeling sure that in the Gruss Air Spring it had a superior article, nevertheless, wished to know how it could be de-

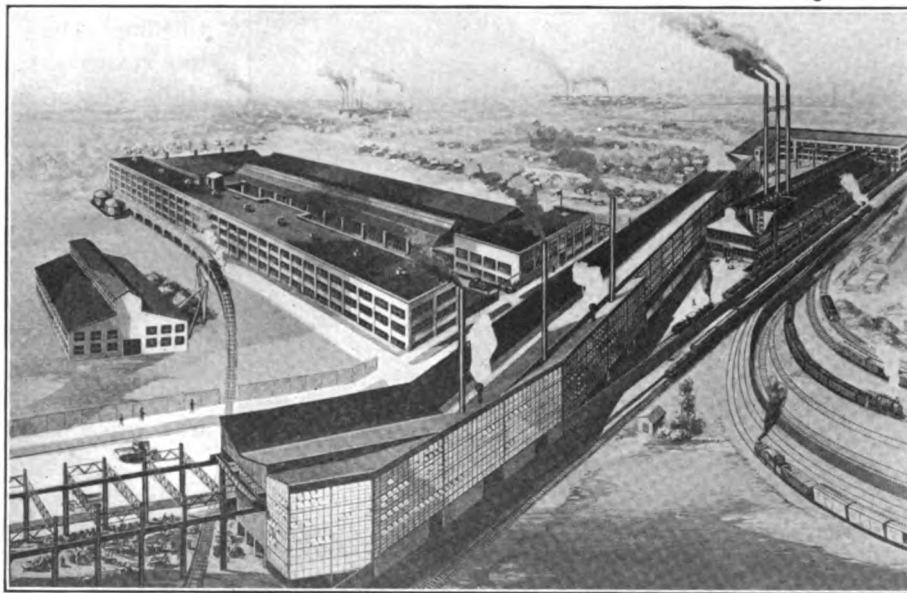
veloped to still greater efficiency. Having determined all these things, the officials of the company, thoroughly convinced of the high quality of the product, investigated the present as well as the potential market for the sale of the springs,

this branch of the work being handled by F. H. Burr, for years the foreign market representative of the company.

Mr. Burr, through his knowledge of export markets, was well equipped to handle this phase of the business and after several trips to various parts of the world where the company has sales offices, ending with a carefully planned tour of Canada and the United States, decided that the market for the product was unquestioned.

The outstanding feature of the Gruss Air Spring—the one salient point, aside from its mechanical fea-

tures that makes it unique—lies in the fact that it actually saves money for the operator of the car or truck on which it is installed, due to the manner in which it lessens the wear on tires, engine and the various component parts of the vehicle. This



Plan: of Cleveland Pneumatic Tool Co., Manufacturer of Gruss Air Springs.

statement is authenticated by the actual records of many fleet owners, who willingly produce figures that entirely prove this contention, and the careful observer of the effective shock absorbing features of the



F. H. Burr, Manager, Automotive Division, Cleveland Pneumatic Tool Co.

device will believe this to be so without further demonstration once the principle of the spring has been explained to him.

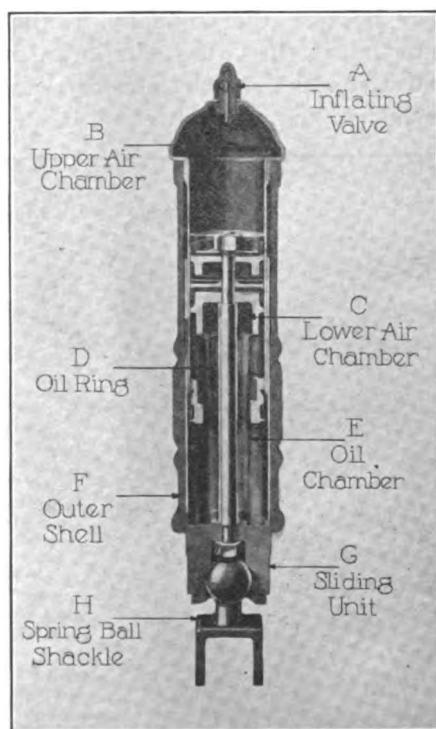
The great enemy to successful motor vehicle operation is the frequent high operating cost of repairs and renewals of parts and tires. Tires, regardless of how carefully manufactured, do not deliver satisfactory service largely because of the strains and stresses encountered through service on unsuitable highways; and, either through inadvertent operation or certain fundamental weaknesses, repairs to the power plant and frame are frequently necessary. Springs and axles, in a manner unaccountable to the operator, frequently break. In a majority of cases these mechanical faults develop through crystalization of the metal, a subject on which a volume could be written and the cause of many motor evils. Excessive bumping, shaking, wrenching and twisting of the machine has brought about this crystalization with the result that the part has failed, and the vehicle must be laid up for repairs (many times when it can ill be spared from service), thus adding expense to the money loss occasioned by the service charge.

If every car and truck turned out

by the several hundred manufacturers in this country could be driven in a manner exactly prescribed by the builder they would probably have an average life of fifteen years instead of the six or seven they now have—this statement in effect was made by a prominent man in the industry and to my way of thinking is positively true. But they do not get this treatment because operators do not give it to them.

The Gruss Air Spring, it is claimed, will offset the abuse which the car or truck all too frequently is called on to suffer at the hands of the careless operators; actually can and does keep the vehicle out of the repair shop and lengthens its life through minimizing or neutralizing the strains and stresses consequent on overloading and faulty operation.

At first glance the foregoing statement seems almost too strongly put, but a little study of the principle by which the Gruss Air Spring functions, together with an abstract knowledge



Construction Details of Gruss Air Spring.
(For Explanation See Text Below.)

of the automotive vehicle, will show just why it is a fact.

Details of Construction.

In order thoroughly to understand the features of construction which account for the facts narrated, let us look at a cross section of the absorb-

er, as displayed on this page, which shows the spring (which actually isn't a spring at all) in phantom view. The first point that we shall take up in explaining the device is "F," which is the outer shell that



J. F. Wallace, Engineer, Automotive Division, Cleveland Pneumatic Tool Co.

fastens the absorber to the frame of the car or truck. Heavily built of the finest of steels, this fitting is so constructed as to be capable of standing the heaviest strain to which it may be put and is so designed as to be fastened to the chassis without weakening it—a point incidentally, the importance of which cannot be too strongly stressed as certain installations of early model shock absorbers have tended to weaken the side members of the car and truck frequently to the extent that they have collapsed under sudden shock.

The next point of construction to be noted is the other fastening "G." This is a sliding unit which fastens the damper to the spring of the vehicle which is not changed in any way when installing the device.

"E" is the oil chamber. This is filled by injecting the proper grade of lubricant into the chamber until it is completely full.

A small amount of the oil also is added to the air chamber "B" above the piston, as shown in the cross section view, which acts as a seal to keep the air positively confined in the air chamber after this chamber has been filled with air through the valve "A" at the top of the device, which valve, incidentally is not unlike a superior type of tire valve, and

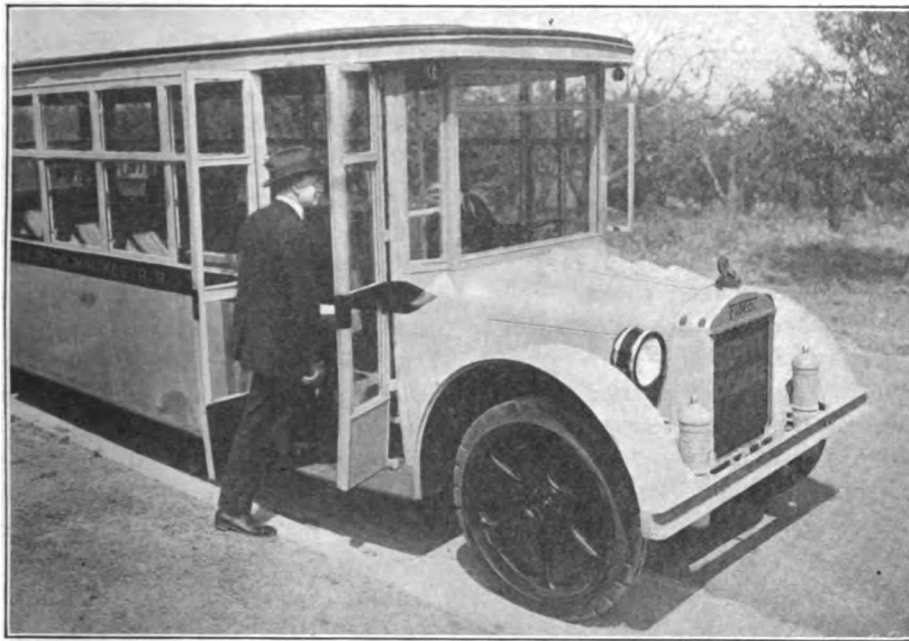
it is protected from all chances of accident by an exceptionally heavy polished acorn-shaped cap. As this air under pressure enters the upper

being designed to minimize the downward thrust of the load rather than the rebound. For many years experiments generally were con-

ment of the shock absorber was made.

Effectively Checks Recoil.

The Gruss Air Spring, however, from the start was designed entirely along these latter lines and as a consequence wholly does away with chances of damage resulting from the unusual or excessive recoil with its resultant "throw" or rebound and its toll of broken axles in the following manner: The piston in the air spring (glance at the cross section again) when unusual jounce is experienced has a tendency to be pulled downward sharply by the spring of the vehicle as the heavy load throws back from the jounce. As the piston starts downward in response to this pull, however, the oil compresses and seeks an outlet from the chamber. There is only one place where it can leave the chamber—through the small oil ring "D," and as it is forced through this orifice under strong compression it retards the rebound of the vehicle, minimizing it and distributing it over a long, gradual arc, rather than a short, sharp jounce, being further aided in controlling the recoil by the very apparent fact that as the oil rises in the lower air chamber "C" compressing the air, a secondary



Gruss Air Springs Work Efficiently on the Lightest Passenger Car or the Heaviest Bus. Photo Shows Equipment on Fageol Safety Coach.

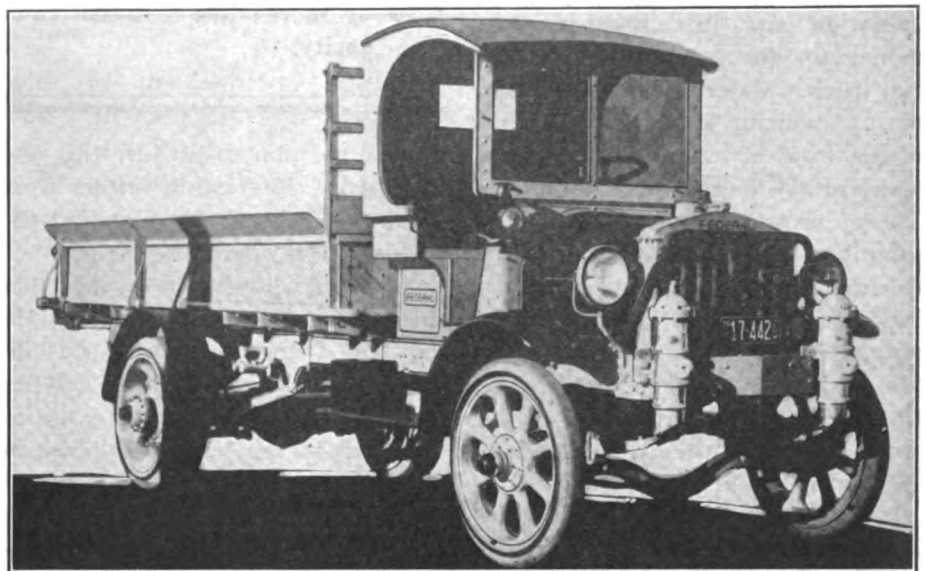
air chamber "B" it lifts the truck until the piston of the device is in the position shown on the cross section, at which time the truck or car is in an ordinary riding position.

Recoils of all kinds, regardless of their force (and this statement goes as it lays) are checked by the lower air chamber "C" and thus the truck is actually suspended on cushions of compressed air, the degree of compression being determined wholly, as will be seen, by the weight of the vehicle, this weight varying as load carried increases or decreases, the vehicle automatically assuming that position which is best calculated for easy riding, the operator having absolutely nothing to do with this phase of the operation.

Withstands Severest Shock.

The rebound, or recoil as it is sometimes called, of the car or truck when heavily loaded, is the action that breaks springs and damages other component parts of the vehicle. This fact, wholly at variance with a former conception that the downward thrust of the load was responsible for the breakage, has proved a source of worry to manufacturers of shock absorbers in the past, nearly all models developed

ducted from the erroneous belief that these breaks occurred on the downward jounce of the vehicle—with the result that few of the earlier types of shock absorbers were efficient. As it became generally recognized, however, that it was recoil, or upward thrust of the jounce



Motor Truck Equipped with Gruss Air Springs Which Not Only Save Fuel and Tires, but Eliminate Breakage and Lengthen Life of Vehicle.

that caused the damage, experiments tending to minimize this action were undertaken with the result that a great forward step in the develop-

"cushion" is automatically formed which results in the jounce being controlled from two sources, thus doing away to as great an extent as is

humanly possible with the danger of broken parts, while at the same time lengthening tire life. Truly an ideal shock absorber and one that is entirely worthy of the name "Air Spring"—a scientifically correct device which by reason of its simplicity of design is as long lived as it is simply constructed.

Speaking of this latter phase, the very fact that the spring, because of the oil which plays so important a part in its operation, is lubricated at all times is one big reason for its long wearing quality; this combines with the fact that it is constructed as finely as possible by a company that has unreservedly turned its years of experience in the manufacture of pneumatic tools into the building of the device to make it an ideal piece of equipment. Design also plays an important part in the life of the springs; there is nothing to get out of order, a minimum of moving parts positively lubricated at all times, the whole assuring exceptionally great ability to withstand wear.

Records Prove Value of Spring.

The foregoing, written in a manner that will be readily understood by the layman who will study the diagram and the text, seeks to show why the Gruss Air Spring is entirely practical in design, principle and operation and just how it saves money for the operator of the car and truck. Material evidence of the most convincing kind is also at hand in the form of actual records from many of the largest fleet operators. These firms, especially careful in compiling the item of overhead represented by truck delivery costs offer statistical data that entirely prove the contentions made by the company and undoubtedly will convince even the most skeptical of the profit-enhancing value of the Gruss Air Spring.

It is an easy matter for the manufacturer to make redundant statements as to the high quality of his product and what it will do—it is quite another matter to show unsolicited testimonials from those who have used this product that entirely corroborate his statements. But the Cleveland Pneumatic Tool Company

SALIENT FEATURES OF THE GRUSS AIR SPRING.

1. It floats the load on air.
2. Lowers upkeep cost of car or truck.
3. Operates without attention.
4. Saves tire wear.
5. Pays for itself through savings made.
6. Reduces breakage of cargo.
7. Smooths out the roughest road.
8. Allows greater speed.
9. Makes the truck as easy riding as the car.
10. Gives perfect traction.
11. Decreases gas consumption.
12. Prevents rebound and side-sway.
13. Makes it possible to increase tire pressure.
14. Makes the machine 100 per cent. efficient.

Gruss air springs fully guaranteed against defect in material, performance or workmanship are made in four sizes; the Junior for cars up to 2600 pounds; the standard for cars weighing more than 2600 pounds and light trucks; the Transport Special for motor buses and the heavy duty for heavy trucks of more than two-ton capacity.

is in a position to do just this and has many interesting letters from operators who have installed the springs. Bus operators, of their own volition, have written to say that their passenger traffic after installing the Gruss Air Spring has increased in cases as much as 100 per cent. due to the easy riding qualities imparted to the bus by the use of the springs.

Truck operators with a single machine who drive with overloads many times, have testified that the use of the spring has changed their business from a game of chance to a profitable investment, due wholly to lessened expense of operation and the lowering of repair costs, and big fleet operators have come forward

to say that where the springs were installed they have been able to increase profits in a manner little short of the miraculous.

One large wholesale egg buyer who operates several trucks and makes his purchases from farms, a business which necessitates constant driving over unimproved highways that in many cases are little better than mountain trails, asserts and stands ready to prove that breakage—always his biggest item of overhead, has been lowered ninety per cent. since installing the springs. Testimony of this nature which can be corroborated in a manner satisfactory to the most skeptical, goes far to prove the actual fact, and quite naturally counts materially in lessening sales resistance of the springs.

Enhance Appearance of Car.

Despite the heavy rugged construction of the Gruss Air Springs, they are designed and proportioned in such a way that they enhance the looks of whatever form of vehicle they may be installed on; a heavy, grimy, truck used in transporting coal, sand, gravel or like materials is given a look of power by the use of these finely finished springs. When seen on a passenger bus one unconsciously gets the impression that somehow or other they impart to the vehicle the appearance of comfort and greater dependability. On the passenger car, regardless of whether it be low or high priced, they accentuate the smartness of the lines.

Charles W. Kramlich is now affiliated with the Fafnir Bearing Company, New Britain, Conn., as sales engineer, covering Wisconsin and Minnesota. He was formerly assistant chief engineer with the United States Ball Bearing Manufacturing Company, Chicago, Ill.

George L. Lavery has been appointed general manager of the Tire and Rim Association of America, Inc., and will in the future be located at the offices of the association, 537, Leader-News building Cleveland. He was formerly manager of the steel wheel department of the West Steel Casting Company, also of Cleveland, with which he has been associated for the past 10 years, and will continue to act as its consulting engineer.

H. H. Gilder has been appointed district manager of sales, with headquarters at Chicago, for the Timken Roller Bearing Company, Canton, O.

Miami Trailer Designed to Use with Fordson

THE constantly increasing use of the Fordson tractor in commercial hauling and other industrial work has created a demand for special hauling equipment designed to be used with it. To meet this demand the Miami Trailer Company, Troy, O., has just announced a new special Miami Fordson Trailer.

This trailer is of all-steel construction except wheels and tires. It has a rounded load capacity of two yards, with provision for mounting

the rear housing of the tractor. The Fordson is simply backed up to the end of the trailer drawbar and the coupling is completed without pins or cotter keys. Only a slight upward pull on the drawbar is necessary to disconnect the trailer from the tractor.

Both release and winding levers of the trailer are placed at the right hand of the tractor driver. This eliminates the necessity of stopping to dump or spread the load, or to re-

for garbage and refuse disposal in cities.

The operation of the Miami Fordson Trailer is so simple that it can be handled by any boy who can drive a tractor. The Miami Trailer Company claims that one man with a Miami Fordson Trailer can easily transport as much material in a ten-hour day as three men and three teams.

This new model Miami trailer, while designed to be used with the Fordson tractor, is equally well adapted for use with all other tractors with a drawbar rating similar to the Fordson. It can also be used on $2\frac{1}{2}$ and three-ton high-speed trucks.

Specifications are as follows: Track, sixty inches; axle, five per cent. nicked, $2\frac{1}{4}$ inches square; bearings, Timken roller; wheel artillery, thirty-six by five inches; tires pressed on, thirty-six by five inches; springs, forty-two inches long, three inches wide, eleven leaves; frame rolled channel, five inches; body steel rounded load, two yards; height loaded, sixty-four inches; height unloaded, $65\frac{1}{2}$ inches; carrying capacity, $2\frac{1}{2}$ tons; Fordson hitch, special automatic; weight complete, 1960 pounds.



Miami Trailer Which Meets Demand for Special Hauling Equipment to Be Used with Fordson Tractor.

a separate flared top box of one-half yard or one yard extra capacity for transporting materials of a total load of two and one-half tons, but of greater volume than two cubic yards. With ample factor of safety the carrying capacity is two and one-half tons.

The body, which is of ten-gauge steel, well reinforced with heavy angle arms, is designed with a rear bottom dump door, so that the size of the opening may be controlled either to dump the entire load in one spot, or to spread the contents sixty yards wide to any depth desired. The entire load dumps back of the axle and behind the wheels of the trailer. The load is practically balanced on the axle, sufficient weight being placed on the drawbar to prevent wear in the hitch connection. The special automatic hitch bolts on to

wind the dumping door. Such flexibility of operation greatly reduces ton mile costs.

The turning radius is that of the Fordson tractor. The unit can be backed into any position or can be turned around easily on the sub-base of a road. This flexibility is important for operation in close places.

The Miami Fordson Trailer is especially fitted for road and street contract work; for repairing of streets and roads; for hauling and spreading crushed stone, gravel, cinders or dirt; for transporting concrete mix over sub-grades; for hauling brick; for hauling hot asphalt; for building and excavating work; for constructing dams, levies and embankments; for coal deliveries at curbstone and manhole; for transporting refuse sand from foundries;

F. J. ALVIN RESIGNS FROM U. S. TRUCK.

CINCINNATI, O., Dec. 12.—Forrest J. Alvin, for the last seven years general manager of the U. S. Motor Truck Company, has resigned his position with that manufacturer and plans to take a vacation, following which he will again enter the industry in a position not yet announced.

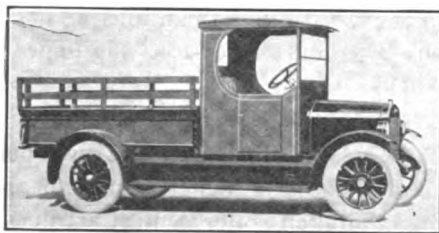
Mr. Alvin recently was the victim of a serious automobile accident from which he narrowly escaped with his life, as a result of which, although no permanent after effects are feared, he has been ordered to take a rest, and for the next few weeks at least will be at his home, 2218 Eastern avenue, Covington, Ky.

United Motors Announces Highway Special

THE Highway Special, a new product of the United Motors Products Company of Grand Rapids, Mich., was announced late in the summer and sample jobs have been placed in the hands of distributors throughout the country.

The new truck is of 500-2000 pounds capacity and this announcement created the needed interest because of its exceptionally low price for a strictly commercial vehicle of this capacity, \$895, for the chassis, including electric lighting and starting equipment and pneumatic cord tires.

THE chassis has been worked out in accordance with the most advanced truck practise and is the result of the United organization's 12 years' experience in building heavy duty trucks. The feature which the company is stressing is the fact that every unit is a high grade truck part and that the Highway



United Highway Special with Combination Express Body and Cab.

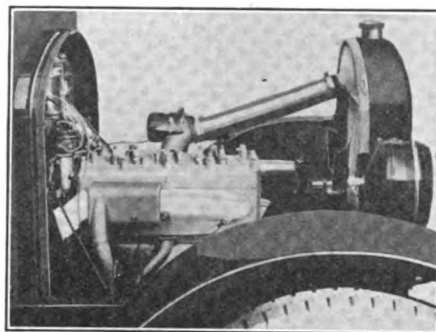
Special does not follow pleasure car design in any particular.

The Highway Special is adapted to high class delivery service when equipped with panel body which is of exceptionally pleasing lines and attractive finish and is also supplied from factory with canopy stake and express bodies, which has been standardized for this job.

Photographs and details of the Highway Special, together with specifications, appear in this issue for the first time. The engine is a special Hershell-Spillman, having a bore of $3\frac{1}{2}$ inches and a stroke of five inches. The electrical equipment is of the latest type Bosch system. The cooling system includes a baked enamel, heavy pressed steel shell radiator with removable core and tanks. Special attention has been given in mounting to prevent vibration and road shocks on the core.

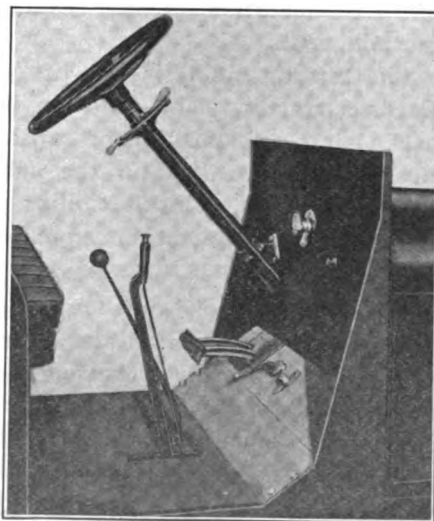
Zenith improved jet type carburetor is used with gravity feed from fifteen-gallon tank located under seat. The clutch and transmission is a Fuller unit power plant, three-speed selective type with dry plate,

multiple disc clutch. The rear axle is a Columbia spiral bevel type with one-piece pressed steel housing, 5.8 to one ratio. Drive is taken by single Spicer propeller shaft of $2\frac{1}{2}$ inches diameter tubing with two universals. Both brakes operate on drums on rear wheels with $16\frac{5}{8}$ -inch drum. The frame is of pressed steel construction $4\frac{5}{8}$ inches deep with $3\frac{1}{2}$ -inch flange at center. The dis-



Motor of United Highway Special Showing Accessibility of Various Units.

tance from back of driver's seat to end of frame is ninety-two inches, with 128-inch wheelbase. The steer-



All Controls Are Conveniently Placed and the Dash Has Neat Appearance.

ing gear is of the Lavine latest type through worm and nut with accessible adjustments for all wear. Springs are of the semi-elliptic type,

chrome vanadium steel; front eight plates $2\frac{1}{4}$ inches wide by $36\frac{1}{4}$ inches long, rear ten plates $2\frac{1}{4}$ inches wide by $46\frac{3}{4}$ inches long. Both the drive and torque are taken by the rear springs. The wheels are wood artillery type with Firestone rims and $32 \times 4\frac{1}{2}$ tires.

Standard equipment includes complete set of tools, hand tire pump, jack and electric horn. Standard colors are black running gear with United green wheels.

MOCK BECOMES BESSEMER GENERAL MANAGER.

GROVE CITY, PA., Dec. 13.—Following the report of a week ago that the Bessemer Motor Truck Company and the American Motors Corporation would merge under the name of the Bessemer American Motor Corporation, comes the announce that Ralph D. Mock has become general manager of the Bessemer Motor Truck Company. He is known to the industry through his service as vice president of the Hydraulic Steel Company of Cleveland, O., with which concern he was associated for a decade and also through past activities with the Motor and Accessory Manufacturers' Association.

He was associated with others in the organization of the American Motors Corporation of New Jersey, which has resulted in that company's financial rehabilitation.

The Bessemer plant reports greater sales in November than in any preceding month of this year, and also appointed a number of new dealers and distributors. Mr. Mock stated that the Bessemer policy of maintaining factory branches in certain principal cities will be continued and the number of such branches in-

(Continued on Page 666.)

Highways and the Tax Payer

(By A. J. BROSSEAU, President, Mack Trucks, Incorporated, and Member of Highways Committee National Automobile Chamber of Commerce.*)

ONE engaged in the every-day occupation of selling transportation struggles with many unsolved problems, some of which I should like to place before the educator.

Transportation is, perhaps, the most vital factor in the lives of all of us. How much attention has it been given in the text book and in class room work?

How does the educator define transportation?

HAS he taken into account the fact that highway transport has already injected new factors into our economies?

Does he understand the relation between the highway and the vehicle and the important service they render to the public?

Does he know that the highway and the vehicle together constitute a great factory which produces the commodity we call transportation?

Does he realize the importance of these factors in the financial scheme of things and is he prepared to assist in developing sound theories not alone of finance, but of the actual physical structure of road and vehicle?

Does he know that transportation is today the most important problem confronting the nation, and, if we are to arrive at sound conclusions, one that requires the best efforts of the most efficient research men obtainable?

Has it ever occurred to him that the highways are not built for the individual owners, but for the public, and that the privately owned vehicles operating over the roads are in reality mere agencies for the convenience and comfort of this same public?

Major Phase of Public Service.

I ask these questions because before we can approach the problems of highway finance with the enormous sums involved, it is essential

(*An address on "Problems in Finance," delivered at the Second National Conference on Education for Highway and Highway Transport Engineering, held under the auspices of the Highway Education Board at Washington, D. C., Oct. 26-28, 1922.)

Does he think of it as it was twenty years ago when the railroad was the only carrier, or in terms of the highly complex relationships of today when we have highway, water-way, electric and steam rail lines, and very soon airways to be correlated?

Is he dealing with it as it will be in the future when these agencies may overturn all of our accepted theories of economics, social life and political boundaries?

SIGNIFICANT POINTS IN THE ADDRESS.

Motor transport is a major phase in public service.

Engineering records show that from forty per cent. to fifty per cent. of highway cost is permanent investment.

A highway, properly maintained, is a permanent highway and will not "wear out before the bonds mature."

Highway construction costs should be divided between the present generation and those to come who also benefit.

Long term bonds are economical as they permit more extended construction immediately with benefits resulting promptly.

for us to understand that we are dealing with a major phase of public service.

If highway transport had not become a vital element in serving the public, if the public realizing its cost did not still demand it because of the benefits which it brings, then the educator would not be justified in considering this question.

The recognition which national, state and county governments have given through the large appropriations already made for highway construction, and the ever widening use of the motor vehicle, demonstrate conclusively the public acceptance of individual transportation.

Is not the task of the immediate future, then, that of laying out broad policies which will make high-

way transport of the greatest benefit to all?

Must Readjust Policies.

The first step, as I see it, is a readjustment of our financial policies which will permit the counties and the states to carry on their programme of highway construction and maintenance in the most equitable manner possible.

Incidentally, we will have to readjust our administrative policies so that when these expenditures are made, they shall fit most exactly with the needs of public service.

Every dollar of expenditure must return at least a dollar's worth of service.

A survey of highway development as it is today shows that we are annually appropriating sums aggregating more than \$1,000,000,000 for city and rural highway construction and maintenance. A further survey of our needs shows that this programme must be continued for ten years or more if we are to arrive at a connected system of highways which will render the greatest possible service to the public.

If we were dealing with this question in the untroubled days before the world war, the matter of finance would be a relatively easy one and we would not be so much concerned with ways and means. But it is necessary to remember that today the nation is carrying a heavy tax budget, and, what is more important that the state and county levies are at higher levels than they have been in the past.

We must weigh well all of the elements entering into any appropri-

tion for any purpose and only those must be made which we know will surely return a direct profit to the public. Further we must seek to definitely allocate those profits so that the burden will be borne in as large a measure as possible by those who are the beneficiaries.

Who Benefits?

Who benefits from highway improvement?

In any attempt to answer this, and the many other questions ahead of us, there remains still much research work to be done. Now, therefore, the purpose must be to sketch out the paths which are indicated by governmental studies up to the present time, in order that the issues may be clarified.

Broadly speaking, we will all agree that those who are alive today and those who come after them down to the children of the third and fourth generations, will benefit from highway construction, provided that, once constructed, the highway is maintained.

Some might go further and say that the highway, if maintained, will be of benefit for all time, but looking at this as practical men, we can concern ourselves only with a definite period of time wherein the inventive genius of the country would not have opportunity to upset our present scheme of transportation by new methods. This might well be from fifty to one hundred years.

Long Term Bonds Equitable.

It would then appear as a general proposition, assuming the ability of our engineers to maintain a highway once built, that the cost of highway construction should first of all be divided between this generation and those to come, which, of course, at once implies long term highway bond issues.

Here again, however, we come at once to practical limitations, the extent of which must be finally determined by economic research.

Can the highway engineer maintain the road once built?

We have been accustomed to hear that roads have broken down under heavy motor traffic and that money expended for them has been wasted.

Is this true? Fortunately, in this field we appear to be arriving at a definite demonstration of facts. Engineers tell us, for example, that forty to fifty per cent. of the cost of construction of a highway is a permanent investment, assuming that the highway has been properly located. The right of way, the grade, the drainage, bridges, shoulders and engineering costs need only be paid for once. It is the surface which wears.

Engineering records show that here the loss is less than is popularly supposed since in the rebuilding of a surface it is possible to salvage much of the material and use it for a base for new surfacing.

Constant Maintenance Essential.

This leaves us with a definite need for constant maintenance and that maintenance is limited not by physical, but by financial ability. We have placed too much stress upon the original construction and not enough upon the constant maintenance.

Can we assume proper location of the highway? Here again is a field for the student of political administration in its relation to economics. The state engineer looking at a map which shows the economic development of a state, the routes of through travel, and the feeder lines, has before him a bird's eye picture which enables him to determine positively and accurately where highways should go. We cannot expect the local official to be able to gauge this so well. Centralization of authority seems essential if the public's funds are to be properly conserved.

Should we seek to develop all highway construction through bond issues?

This question is one which cannot be fully answered until those preceding it are taken into account.

Before we expend any funds we must know that the benefits to be derived from the improvements of a highway are more than sufficient to justify the cost of that improvement.

We must then be sure when bond issues are proposed that the improvement promises something more than the cost of maintenance.

Funds Must Be Assured.

Before granting the authority to issue bonds, provision must be made for the proper control of construction expenditures, adequate maintenance and sinking funds.

These points checked off, we are likely to find that we have come down to a consideration of the improvement of the main state systems, which will average about seven per cent. of the total mileage of this country. When completed this system will place all of us on main roads, or but a few miles away and through the feeder lines we will be enabled to reach the great highway and deliver our commodities to market.

Here then is the field in which the cost of highway construction should be divided between this generation and those to come.

We are proposing that this generation shall undertake to build these roads, charge the cost to capital account, pay for them by long term bonds, use them and pass them on to the next generation in as good or better condition than we built them. We propose that each generation shall pay a fair rental charge for the use of these roads in the sum of amortization charges and interest, plus maintenance.

Shall we not then proceed as would a business man, or a farmer, when setting up his establishment? The full cost of the factory or the farm would not be assessed against the first year's income, but would be carried over a term of years, during which time the returns would be enough to meet all charges and pay a profit as well.

Does Not Mean Universal Bonding.

This must not be taken to mean, however, that we should at once proceed arbitrarily to say to every state, you must have a bond issue to take care of your road improvement programme. As in all other phases of this complex problem there are a host of limitations to be set up, and it is only through investigations by trained men that we shall ultimately find the correct answer.

Dogmatic statements must be avoided. Prejudice must be elim-

inated.

Analyses of highway development to date show that there are two general sets of conditions which apply. The first is found in those states which, like New York, Massachusetts and some of the other eastern and perhaps middle western sections, have to deal with a developed traffic problem and have already met with many of the conditions mentioned.

Perhaps Maryland is the best example, for it has a highly developed state system paid for in large part by long term bonds and now maintained from current operating funds. There is no need for a further bond issue in Maryland today. Perhaps there never will be. The problem of construction on the state system has been largely dealt with. In such cases there may be a period when short term bond issues will be found advisable in small lots, as often happens in business, but there is no thought that long term issues should be generally imposed where original construction has been advanced as it has in Maryland.

Where Bonds Are Needed.

The other condition is that of the southern or western states, where valuations are low, mileage is high and traffic not yet developed. Here the problem is one of construction, largely. The general tax burden is high and any attempt to meet the needs of highway development from current funds would result in so retarding the programme that dollars would be lost in diminished or retarded economic development where pennies would be saved.

The question which here must be answered is, "Do the increased profits resulting from highway construction under bond issues, offset the difference in cost as between 'pay-as-you-use' and 'pay-as-you-go' methods of financing?"

Looking at this from the viewpoint of the business man suggesting clues to be run down, I want to state at the outset that if you consider this problem from the standpoint of building, let us say, one hundred miles on a pay-as-you-go policy in ten years' time as against one hun-

dred miles in one year with a bond issue, in the first case, in ten years you will have paid all of the principal charges of that one hundred mile construction, but will have obtained only an average use of fifty miles for the entire ten year period, while one hundred miles built in one year give the use of the entire mileage.

This immediately suggests again the question of the benefits to be derived. In either case it must be assumed that there is to be a benefit, or the programme should not be undertaken. The difference then is the interest charged.

Against that there is the ten year use of the one hundred miles, and engineering investigations now under way indicate that the difference in operating costs of transport alone over the good road as against the bad would be sufficient to defray the interest charges many times over, even if we discarded the social benefits which inure.

Who Shall Pay?

Thus far we have discussed as beneficiaries only two general classes, this generation and those that follow.

If the highway bond issue plan is to be carried out, however, we must set up the conditions under which these bonds will be issued, and in order to do so we should determine more specifically the question of beneficiaries in order that, in setting up our source of revenue, we shall be as equitable as possible.

At once a new set of questions presents itself for examination.

What is the effect of highway improvement upon agricultural valuations?

What is the effect of highway improvement upon urban valuations?

What is the effect of highway improvement upon the operating costs of the user, the agent of the public?

The answers will vary according to the typographical conditions, economic conditions, the extent and character of the traffic. Each state will have to meet this situation as its own needs demand and these needs can only be finally determined by specific inquiry and investigation

upon a very broad scale.

There are few today, however, who will deny the influence of highway development upon the farmer. The truck gardener, the dairy products man, and even the producer of heavy staples, has found his markets favorably affected by highway improvement. Perhaps more important, the educational and social advantages derived from highway extension have opened a new vista to all.

Likewise, the development of urban properties and particularly of suburban properties has been perceptibly affected. No one who drives a motor vehicle or a horse will question the beneficial effect of highway improvements.

How far the use of large units made possible by road improvement has affected the economics of all three groups mentioned is a point which few can discuss fully yet, particularly with regard to road improvement costs, but here again there is a definite problem to be worked out.

General Taxes for General Benefit.

So that while the relative amounts may differ, it seems that any fair plan for construction should be based upon general taxes for construction purposes, since all classes are enumerated in the three broad divisions mentioned.

When maintenance is considered, however, a different answer presents itself. The damage to the wearing surface is done by traffic. Traffic benefits first by maintenance in lowering operating costs, so traffic should be expected to meet this levy.

Yet at once the question arises as to what is maintenance?

Shall we say that a manufacturer building a new plant or installing new machinery to take care of increased business, should consider that an item of current expense?

Could the farmer or business man who attempted to assess such costs against his crop or output in a single year, expect the buyer to pay it cheerfully?

Likewise would the extension of a highway or its widening be an item

in maintenance or construction?

There seems to be a close parallel in these two instances and undoubtedly where cases of this kind occur ordinary business practise will prevail.

The same problem presents itself when a road is lifted from a low to a higher type to the extent of the difference in cost.

Regulation Must Be Flexible.

Another consideration which must be made a matter for thorough study is found in regulation of traffic on the highways. The whole question of finance is tied up in this point, because, after all, the only justification for any highway improvement, as I have already noted, is the service which the highway renders and that service should be permitted to grow without restraint as long as it is sound economically.

If we restrict traffic unwisely, maintenance costs may be less, but transport operating costs may be swelled out of all proportion, and since the public pays the bill in any case, we should seek to make highway transport in its entirety function at the lowest possible cost.

Here we can suggest a prolific field for investigation. Overloading apparently damages both road and vehicle. Seasonal limitations appear to be necessary under certain conditions, and still with a railroad congestion such as obtains today, which is of the greater public moment—the maintenance of a low grade highway surface, or its destruction by goods which must be moved?

There should be definite restrictions on maximum loads, of course, at least until the highway builder can catch up with the highway user—a goal still far in the future—but it is not necessary to consider this phase in detail now.

I only wish to point out that unwise regulation, just as abuse of the road by the user, may operate to the detriment of the public interest, and therefore both should be carefully guarded against, particularly where we are concerned with the general aspects of a broad financial programme predicated upon the need for traffic development.

Summing up the points made, then, I would like to suggest that out of the questions presented for your analysis we have indicated the need for a very definite policy of highway finance.

Suggested Financial Policy.

Personally, I should say that subject to varying conditions of highway development, of valuations, population and traffic in the several states, the programme resolves itself into this:

First: The preparation of a "construction budget" by every state, estimating the cost of the primary and secondary roads to be built, year by year, for the next ten years.

Second: That based upon the stage of development of that programme at this time, the cost of construction—all or part—shall be met by bond issues, except in those states where the construction programme is practically complete.

Third: That a budget of current operating costs be set up to defray—interest on bonds, amortization charges and maintenance. The amount necessary to pay interest and amortization should be included in the general tax levy. The cost of maintenance should be assessed against the user.

Fourth: That all expenditures should be under the control of the state highway departments.

Fifth: That regulatory powers should be as flexible as possible and lodged only within the state highway department, to be administered in accordance with the needs of the public.

Sound Bond Methods.

As a summary for consideration where state highway bond issues are necessary, I suggest that:

First: Bond issues should be serial in form and issued for as long a period as fifty years. The fund should be expended under rigid engineering control and provision must be made for sufficient current income to pay interest, amortization charges and adequate maintenance.

Second: Interest on bonds and amortization should be paid for from general taxation. Maintenance costs should be charged against traffic.

Third: Maintenance shall include all charges up to and including reconstruction, save extensions or added replacement costs where an inferior is replaced by a superior type of surface.

Fourth: Only that type of road shall be constructed which is adequate for the needs of present and future traffic. This shall be determined by careful surveys both of traffic and of economic possibilities.

In conclusion, may I express the opinion of a business man that, after all, this question is a business problem—that, if you please, of manufacturing transportation. It must be dealt with from that viewpoint alone, if the interests of the public are to be conserved—Courtesy National Automobile Chamber of Commerce.

DIRECT ROUTE TO POINTS SOUTHWEST OF BOSTON.

BOSTON, MASS., Dec. 11.—A communication from Day Baker, secretary Motor Truck Club of Massachusetts, states that Brookline avenue, closed for truck purposes for nearly five years, is again opened.

With the repaving of Brookline avenue, the shortest and most direct route is now open to Norwood, Millis, Franklin, Walpole and all points southwest of Boston. This route has less corners to turn and is more direct than routes previously used.

Trucks coming over Massachusetts avenue, and Harvard bridge, or over Charles street and Beacon street, should turn at Kenmore Station (Governor Square) on to Brookline avenue, which has all been recently resurfaced. This gives a direct route by way of Brookline avenue and Boylston street, through Brookline Village and thence through Boylston street to the point where the route to Needham joins that thoroughfare.

This route is much more direct than by using Beacon street, turning at the Reservoir through Middlesex road and Hammond street and avoids four dangerous corners.

The roads on this route are now all in first class condition.

Motor Bus Activities Abroad

AUTOBUS companies have been formed in the cities of Madrid, Barcelona and Valencia, which are backed by British capital and are using the motor buses of Tillings-Stevens Motors, Limited. These companies are selling bonds in the various cities of Spain and will extend their services to cover the total area of each city through municipal concessions. It is to be regretted, says Gordon Lee, chief of the Automotive Division of the Department of Commerce, that American motor car manufacturers do not develop foreign markets for their products in a like manner, with the assistance of American bankers.

THE autobus company in Madrid, according to a report to the Department of Commerce from Commercial Attache Charles H. Cunningham, has contracted to put 107 buses in regular operation within the next 14 months, and plans are being laid to extend the total to 160, including reserve buses.

The company organized in Barcelona, with a capital of 10,000,000 pesetas, subscribed in part by British interests, will extend its services to 150 buses, covering all the routes in the city and connecting with the suburbs. Consul Thomas W. Chilton reports to the Department of Commerce.

Commercial Attache Cunningham also reports that the city of Madrid has just passed a resolution in favor of the purchase of 12 motor ambulances at a cost of 250,000 pesetas.

It has declared its intention to reconstruct the street cleaning service and will purchase motorized street sweepers, sprinklers and rubbish wagons.

Consul F. T. F. Dumont, Frankfurt-on-Main, reports that German motor vehicle factories in the Frankfurt-am-Main district have had large turnovers despite the rising prices. The motor bicycle output is increasing daily and the products are improving in their ability to compete with those of English manufacture.

Exports of passenger cars, motor trucks, chassis and parts from the United Kingdom during September reached the total value of £219,919, which represents an increase of 2.6 per cent. over the £214,223 worth exported during August. The true increase, however, says the Automotive Division of the Department of

Commerce, is shown in the vehicles exported, which numbered 301, as against 273—an increase of 10 per cent. Australia, New Zealand, British India and the Channel Islands continued to be the largest markets among the British possessions, while exports to foreign countries went chiefly to the Scandinavian countries, the Netherlands, Belgium and Spain. Two cars valued at £4820 were shipped to the United States.

CAR AND TRUCK OUTPUT FOR 11 MONTHS—2,344,000.

NEW YORK, Dec. 13.—Motor vehicle production reports presented at the monthly directors' meeting of the National Automobile Chamber of Commerce today show the total output for eleven months of this year to be 2,344,000. This exceeds the record full year's business of 1920, which reached the mark of 2,205,000.

November output of 232,000 cars and trucks was within five per cent. of October, and was twice the volume of the same month last year. In 1921 November business was 26 per cent. under October.

The prevalence of low priced models of closed cars is one of the main reasons for the unusual autumn business, in the opinion of the car and truck makers. Reports from 30 trade associations throughout the country indicate that December business will be moderate, but that the market is expected to be active again with the beginning of the new year.

Lon R. Smith has resigned as vice president in charge of sales and advertising of the Midwest Engine Company, Indianapolis. His plans for the future have not been announced as yet.

TEARS OUT STALLS—MAKES WAY FOR TRUCKS.

IN ANTICIPATION of a great increase in the use of electric trucks in New York during the next two years, garage managers are making substantial enlargements in their service facilities and at least one stable recognizing that Dobbin's days are numbered is being converted to a garage.

The stable of Wendall and Evans Company at 160 West Tenth Street, has room for two hundred horses. The stalls are now being removed, new floors laid, and when the alteration is completed there will be facilities for garaging 175 electric vehicles. The Wendall and Evans garage will handle electrics exclusively.

The Commercial Truck Company of Philadelphia has leased the big building at 524 West Nineteenth street and when alterations are completed will operate a service station and garage with accommodations for 150 trucks. The Walker Vehicle Company of Chicago has outgrown its present quarters in Long Island City and has just given contracts for the erection of a new building at Thirteenth street and Ely avenue, Long Island City. The garage will occupy a plot 100 by 100 feet, will be three stories in height, and with 30,000 square feet of floor space will be able to care for 350 trucks.

Truck Manufacturers to Meet Jan. 11

NEW YORK, Dec. 14.—General Manager Alfred Reeves of the National Automobile Chamber of Commerce, announces that a general meeting to discuss many problems now confronting motor truck industry has been called by the motor truck committee and directors of that organization, to which every motor truck manufacturer is invited.

The meeting, to be held at headquarters, at 10 a. m., Thursday, Jan. 11, which is during automobile show week, promises to be of unusual interest, and it is hoped that every truck manufacturer will have one or more representatives in attendance.

Papers will be read and executives in the industry will discuss some of the most pressing needs for further advancement of the truck industry.

The tentative programme includes among other things, discussion of the following:

- (a) What is Wrong with the Motor Truck Industry?
- (b) How Can Manufacturers and Dealers Cooperate to Make Truck Paper More Attractive to Bankers?
- (c) Is There a Need for a Terms Committee Similar to That in Other Industries Where Deferred Payments Are Factor in Sales?
- (d) Best Methods for Finance Companies to Handle Truck Sales, Including the Length of Time Truck Paper Should Run.

Other subjects include:

Parts Makers' Service Stations and Their Relation to Local Dealers, National Users and Retail Customers. Proper Relation of the Parts Manufacturer with the Manufacturer of Motor Trucks.

There will be two papers discussed in the morning, with two and possibly more in the afternoon. Luncheon will be served at 1 o'clock.

The names of those comprising the motor truck committee are:

Windsor T. White (White) chairman, E. A. Williams, Jr. (Garford), M. L. Pulcher (Federal), R. H. Salmons (Selden), D. C. Fenner (Mack), D. S. Ludlum (Autocar), R. O. Patten (Pierce-Arrow), Ray E. Chamberlain (Packard), F. E. Smith (Republic), F. W. Fenn, secretary.

Mott Urges Uniform Warning Signals

DETROIT, MICH., Dec. 12.—C. S. Mott, vice president of General Motors, is a strong advocate of uniform warning signals in connection with the operation of motor vehicles.

"With the increasing frequency of long-haul truck operation," says Mr. Mott, "and the fact that passenger cars often make long tours, some exact standard in warning signals is absolutely imperative. It is hard to understand why there should be any great difficulty in unifying practice. The men in the freight yards at San Francisco can handle freight in New York, and vice versa. A brakeman on a through freight does not have to learn local signals for every town, or even every state, that he passes through. His signals are understood from coast to coast and from Canada to the Gulf.

"Experience in driving, all over the country, convinces me that the system of signals in use on the Pacific coast is the most logical and reasonable one. There is no chance for misunderstanding and I should be glad to see them adopted as the standard for the entire country. As there are important differences in the form of automotive traffic control used in the different centers; this makes for trouble and annoyance and even for danger.

"It is of course out of the question to utilize the familiar safety devices used on the railroads to control the movement of traffic. Neither the highway nor the city street lends itself to the operation of block signals. What can be done and what should be done as speedily as possi-

ble is to secure uniformity of warning signals given by operators of motor vehicles, passenger and commercial, and uniformity of traffic direction and regulation by traffic officers the country over.

"General Motors is always deeply interested in anything that looks to the greater safety of automobiles."

(Continued from Page 660.)

creased. All factory branches will carry new trucks in stock for the convenience of dealers in surrounding territory in making quick deliveries.

Preparations are now being made for occupying the company's large, new plant at Holmesburg Junction in Philadelphia, and certain additions to the personnel of the company will be made in line with the enlarged production programme which will be carried out in 1923.

The Bessemer Motor Truck Company, from its Grove City, Pennsylvania office, announces price reductions on its two light models. The reduction amounts to \$285 on the 1½-ton model and \$405 on the 1½-2-ton model.

Ralph D. Mock, general manager of the company, states that these reductions are not accompanied by any change in chassis specifications and that these models will not be cheapened in quality because of lower prices, but that such reduction is based upon reduced costs from increased production.

Complete new prices for all models are as follows:

1-1½ ton.....	\$1450
1½-2 ton.....	1995
2½-3 ton.....	2895
4-5 ton.....	3695

TIRES MAY BE HIGHER.

AKRON, O., Dec. 8.—An apparently well founded rumor which persistently has been circulated for the last two weeks, states that motor truck tires will increase in price within the next few months.

One of the best known manufacturers recently commenting on the situation, stated that crude rubber is now at 23 cents, and labor also is higher.

ADVOCATE MIRRORS FOR MOTOR TRUCKS.

MIRRORS on trucks, showing the driver at a glance the condition of traffic immediately behind him, are among the best preventives of traffic accidents in use today, according to A. A. A. officials. Mounted at the left side of the windshield on the open car, or screwed to the frame of the closed car in the same position, the mirror calls immediate attention to a car approaching from the rear and often saves a collision, with resultant loss to both cars, it is pointed out by the association.

"THE A. A. A. has always maintained that every truck in the United States should be equipped with a mirror," said M. O. Eldridge, executive chairman of the A. A. A., "and the addition of a mirror to the left hand side of the passenger automobile would prove a large added factor of safety. The A. A. A. rule of the road is that one vehicle approaching another from the rear and passing it, shall pass to the left of the vehicle ahead, and this rule gives the driver with a left hand mirror a perfect view of the approaching motorist and enables him to give the passing car its share of the road. It does not attract the attention of the driver from the road ahead, as a passing glance is all that is needed to show him traffic conditions to the rear of his automobile or truck."

"Fifteen states and the District of Columbia now require mirrors on trucks, the states being Vermont, Washington, California, Connecticut, Delaware, Pennsylvania, New York, Indiana, Kentucky, Maryland, Maine, Massachusetts, Michigan, Missouri and New Jersey. Nevada is now considering such a law and the movement is spreading to other states.

"Passenger cars can benefit from this example and their drivers can do much to increase their present margin of safety by affixing a small mirror to the left hand side of the car."

TRANSPORT IS SHIPPING TRUCKS TO AUSTRALIA.

MT. PLEASANT, MICH., Dec. 13.—That foreign, as well as domestic industry is rapidly hitting its stride, is evidenced by an order for seven motor trucks received last week by the Transport Truck Company for shipment to Australia.

The order calls for three Transports of 2000 pounds capacity, three of 3000 pounds and one of 6000 pounds. The shipment goes to the Sydney Motor Lorries, Limited, Sydney, Australia, the order coming through Henry W. Peabody Company of New York, Transport's Australian representatives.

APPLETON TAKES OVER RELIANCE TRUCK.

APPLETON, WIS., Dec. 13.—The defunct Reliance Motor Truck Company has been taken over by the Appleton Motor Truck Company. Farm machinery will also be manufactured.

MORE FREE BIRMINGHAM BUSES BOUGHT.

BIRMINGHAM, ALA., Dec. 8.—Three new buses, each of 20-passenger capacity, have been added to the bus line between Ensley and this city, which was put in operation by local merchants. There is no charge for riding in these buses, it being tentatively understood that any who ride will purchase goods of those merchants who own the bus line.

The plan, as announced in the former issue of this trade paper, was tried out as an experiment and has proven so successful that the merchants have incorporated the business, the officers being: J. A. Dupuy, president; J. A. Smith, vice president; George Byrum, secretary and treasurer. Max Cohen, C. A. Stewart, T. B. Work, C. O. Johnson are members of the directory.

Augustus G. Prosperi has been made vice president and sales manager of the Oakland Sales Company, Tampa, Fla. His previous position was that of retail sales and service manager for the Oakland Motor Car Company, Atlanta, Ga.

In connection with the reorganization of the American Metal Parts Corporation, Boston, Mass., as the American Metal Parts Company, Joseph Bornstein has been appointed vice president, works manager and chief engineer. He was president, works manager and chief engineer of the American Metal Parts Corporation.

MUST LINK RAIL, WATER AND HIGHWAYS.

IN THE interests of lower distribution costs, F. W. Fenn, secretary, National Motor Truck Committee, National Automobile Chamber of Commerce of New York, urged upon the delegates assembled at Washington for the 18th annual convention of the National Rivers and Harbors Congress, to give careful study to the coordination of waterways and railways in the wholesale phases of transportation and the motor truck in the retail end.

IN EMPHASIS of this need he pointed out that the prediction had been made by a prominent railroad executive that the next time our country had a real revival of business we would in all probability be confronted with the most severe congestion of railroad traffic and the greatest inadequacy of railroad facilities ever experienced in our history.

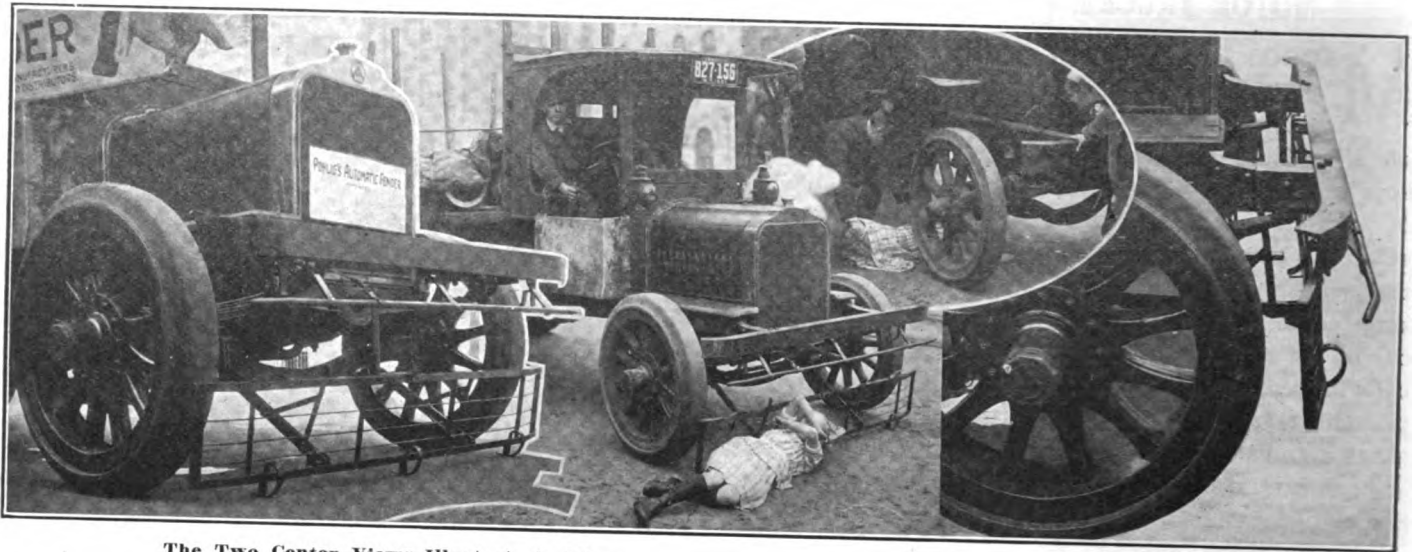
"The 1,000,000 trucks in this country are endeavoring to help the railroads prepare for such an emergency by prompt collection and delivery of less-than-carload freight, which will permit the railroads to render better service to the shippers in this country in the long-haul freight traffic," declared Mr. Fenn.

"In Cincinnati this has meant the release of 66,000 freight cars, the elimination of 30,000 switching cuts and the advancement of the freight movement 52 hours.

"It is an acknowledged fact today in railroad circles that truck operation can be substituted for railroad operation in short branch line and trap car service, and in suburban and terminal distribution. The New York Central lines is in the vanguard of this movement with its container car system of transporting merchandise from shipper to consignee through direct delivery by truck from its railroad yards."

Equal opportunity was open, the speaker felt, for cooperation between the waterways and trucks at the important marine terminals in this country.

Pohlig Fender Fills Long Felt Want



The Two Center Views Illustrate in Vivid Manner the Way in Which the Pohlig Fender Saves Life.

IT HAS long been contended that the high total of deaths resulting from persons being struck by automobiles and trucks could be materially decreased by the invention of some sort of fender which would keep the victim of the accident from rolling under the wheels of the vehicle. In nearly every instance where death has occurred as a result of accidents of this nature it has been due to the fact that the person struck has been run over by the wheels before the vehicle could be brought to a stop.

A COUNTLESS number of safety devices have been developed that claimed to work to this end, but only one that this writer has seen is successful. The exception referred to is the "Pohlig" Automatic Fender, manufactured by the Peelle Company, manufacturer of safety devices, Brooklyn, a company which has brought out an appliance that can truthfully be called a complete success. This statement is further borne out by the fact that the device has the complete approval of the Underwriters' Laboratories so that aside from the protection which it offers to the car or truck, the Pohlig Automatic Fender also reduces the liability insurance of the vehicles, and guards against paying heavy judgments as the result of accident, facts which are of the utmost importance to the operator of the car

or truck.

The Pohlig Fender is of simple construction, consisting of a bumper, a horizontal trip bar and an automatic fender. The trip bar is located an inch or two in front of the fender when driving and the instant the person is struck releases the fender, which drops to the ground

THE POHLIG AUTOMATIC FENDER—HOW IT OPERATES.

WHEN a body is struck the fender automatically releases, drops to the ground automatically, thus pushing the body ahead of the truck and making it impossible for it to get beneath the wheels of the vehicle. The driver has his hands free to stop the vehicle, is not required to lift a finger to operate the fender and need pay no attention to it whatever because, as the name implies, it is actually automatic in its operation.

and prevents the person being crushed beneath the wheels by pushing him along in front of them. It is said to be impossible for the person to get beneath the wheels of the vehicle and the most extensive tests have served to bear out this conten-

tion, the fender never failing to operate, a fact which the company can prove by the signed testimonies of reputable citizens.

To the thousands of car and truck drivers throughout the country who do a large amount of driving and who are always a bit nervous as to the possibilities of accidentally running into a pedestrian, this invention has unusual merit and there is absolutely no doubt but that its wide adoption will guarantee a marked decrease in the number of deaths in which the motor vehicle is concerned.

The company which is manufacturing and distributing the Pohlig automatic fender is by no means a new concern, but for many years has enjoyed a fine reputation as a pioneer manufacturer of fireproof and safety devices, and has an international reputation for building superior fire and elevator doors that have the approval of the Underwriters Laboratories.

Adolph Klein has resigned his position as chief draftsman for the Fifth Avenue Coach Company, New York City, and has associated himself with the Klein Printing Company, also of New York City.

Harry Rose has been engaged as Lincoln sales manager by the F. F. Wood Motor Company, Grand Rapids, Mich. He was previously business manager for the W. D. Block Motor Company, also of Grand Rapids.

Henry M. Hubbard has been appointed supervisor of drafting for the White Motor Company, Cleveland.

Pertinent Extracts from Report of Thomas H. MacDonald, Chief, Bureau of Public Roads

WITHOUT overstatement it may be said that greater progress has been made in providing the means of highway transportation during the fiscal year 1922 than in any similar period in the history of the country. Industrial and financial conditions were better, as a whole, than they have been at any time since before the war, and as a consequence remarkable progress has been made in highway construction under the states and counties as well as under the joint control of the government and states.

Ten thousand miles have been added to the federal aid roads alone, and doubtless more than an equal mileage has been constructed without federal assistance. And there is now apparent a real public appreciation of the importance of maintaining the roads that are built, an appreciation developed in large measure by the forceful words of the President in his message to Congress.

More significant, however, than the progress in the physical work of road construction, or any other accomplishment of the year, are two developments the result of which are not immediately apparent, and which cannot be measured in miles or dollars and cents, but which promise results for the future unequalled by any developments of the quarter century of highway activity.

FIRST of these is the passage of the federal highway act with its plan for a connected system of roads for the whole nation; the second is the extraordinary activity in economy and physical research in connection with the financing, location, management and design of the highways. For more than two decades there has been in progress a slow but certain development of highway construction from a casual activity in the hands of unskilled local officials without plan or programme, other than to maintain an established minimum of facility in highway transportation, toward a reasoned industry in the hands of state and national officials, supplemented by intelligent local aid, the aim of which is to provide complete and economical highway transport service throughout the nation.

In this development the adoption of the federal aid highway act and the significant researches of the past year constitute the greatest forward steps that have ever been made.

The Federal Highway Act.

The federal highway act, approved Nov. 9, 1921, provided for the establishment of a system of public highways the mileage of which shall not exceed seven per cent. of the total highway mileage in any state. The act requires the division of the highways of this system into primary or interstate and secondary or inter-county highways, and limits the expenditure of all future federal aid

HERE IS A REPORT—

THAT every man in any way connected with the Motor Truck Industry should read. It sets forth in clear, comprehensive detail just what the Bureau of Public Roads, in the course of its regular work is doing for the commercial vehicle, and to one who reads carefully, offers substantial proof that the future of transportation by truck, through good roads, is to be well-nigh unlimited.

Viewed from any abstract angle, this report is remarkable for its close attention to facts and absence of conjecture—it's interest is specific to the motor truck manufacturer, distributor, owner and operator because it records the development of America's highways during the last year.

Read it all through, it's lengthy, but well worth your time.

apportionments to this system. The act prescribes that the primary highways shall not exceed three-sevenths of the total mileage which may receive federal aid and that the secondary highways shall connect or correlate with the primary. It also indicates that the systems in adjoining states shall be correlated.

The selection of seven per cent. of

the roads of the nation for future systematic improvement is unquestionably the largest and most important task ever assigned to the bureau. Its successful accomplishment predicated an unusual knowledge of agricultural, industrial and traffic development throughout the country and demanded as an indispensable condition cooperation of the closest and most sympathetic kind with all of the states. The terms of the act are brief and general and the conditions actually existing in the United States vary within wide limits, so that it has required very careful study and adjustment to arrange for the designation and approval of the system of roads required by the law. Immediately on the passage of the act this feature of the law was taken under careful consideration and in December, 1921, the first instructions were issued providing for the submission by each of the states of tentative federal aid systems within the state. In this way an initial expression of opinion and the result of the studies of the several state highway departments were secured.

Arrangements were then made for conferences between highway officials representing adjacent states in order to secure correlation of the roads suggested for the state systems. These conferences are being followed by other conferences in each federal aid district, at which necessary adjustments will be made

to bring the designated routes into entire and detailed harmony with the requirements of the law.

At the end of the fiscal year tentative maps showing the systems proposed by the several states had been received from all states except Alabama, Indiana, Minnesota, Mississippi, Missouri, Pennsylvania, South Dakota, Virginia and Wisconsin, and the first general conference of the states in a field district had been held at Troy, N. Y., at which the tentative systems were correlated for all of New England, New York and New Jersey.

As an example of the difficulties which have to be overcome prior to the approval of such a system of roads as the law requires is that found in states where road construction is well advanced. In such states a large percentage of the principal roads has been improved, and there has been a natural disposition to designate other roads of less importance as the federal aid highway system for the state. The final outcome, however, in all of such cases has been the designation of the most important routes for inclusion in the federal aid system. It is realized by the states that the provision of the law, which permits the extension of the system under certain conditions, will successfully meet the practical requirements of construction as they arise. Another condition exists in some of the western states where the population is widely scattered, road distances are comparatively great and financial resources for road building narrowly restricted. The designation of a system of roads in such states adequate at once to serve local requirements and at the same time correlate satisfactorily with the roads of adjoining states demands very careful adjustments in order to keep the mileage, the resources and the service value of the roads properly balanced and economically justified.

It has been found that the limitation of the interstate highway mileage to three-sevenths of the whole system in some states of large area and limited total mileage precludes a sufficient length of interstate high-

ways to make connections with the systems of all adjoining states and in such cases it has been found necessary to make use of a portion of the secondary mileage to complete the interstate systems.

At the end of the fiscal year none of the tentative systems submitted by the states had yet been approved by the secretary, but agreement had been reached with considerable definiteness regarding a large part of the system for the State of Oregon. It is expected that further conferences by districts will be held during the summer and fall and that the approval of the designated systems will commence shortly after the end of the fiscal year.

In order that federal aid road construction might not be interrupted during the period required for the designation and approval of the federal aid systems required by law, provision was made for giving approval to particular projects that might be submitted by the state where a reasonable showing could be made that such projects would in fact be included in the probable system. This procedure was authorized by the law and adequate administrative methods were devised for carrying out construction under these conditions, so that there has been no interruption or delay in the federal aid programme of the several states on account of the creation of the federal aid system for the country as a whole.

The law requires that within two years from Nov. 9, 1921, maps shall be issued showing the progress in designating the federal aid system and thereafter from time to time showing the progress of selection, construction and reconstruction. Very careful studies are now being made in an effort to arrange satisfactory production of these maps, and in every way possible use will be made of other map producing agencies of the government with minimum requirements in the way of original drafting.

Progress in Road Construction.

From the viewpoint of federal aid progress this year, the sixth since the inauguration of the federal aid

work, divides itself into two periods, the one before and the other after the passage of the federal highway act. The first period was a season of great construction activity during which the greater part of the work of completing the 10,000 miles added to the completion column during the year was done. The same period, however, was one of almost complete stagnation with respect to the initiation of projects. When the year opened there was an unobligated balance of 18,793,544 of the federal aid appropriations and the projects initiated since the beginning of the work aggregated 35,402 miles. By the end of October the unobligated balance had been reduced to \$11,714,328, the lowest it had been since 1918. Only two states, at that time, had a balance of more than \$1,000,000 to draw upon for new projects, and a number were so reduced that their balance was not sufficient to pay for another mile of road. At this time, just before the passage of the federal highway act, the mileage submitted by the states had not only not grown at all since the beginning of the fiscal year; it had been actually diminished as a result of the withdrawal and substitution of projects, so that the total mileage proposed was only 35,379 miles as compared with the 35,402 miles of four months previously. Immediately upon the approval of the new act the initiation of projects took on new life and in the months of March and June reached the unprecedented total of 1250 miles a month. At the close of the year the submitted mileage is 39,940 miles, 4538 miles greater than at the close of the preceding fiscal year.

At the close of the preceding fiscal year projects completed aggregated 7469 miles and there were 17,978 miles under construction which were estimated as 50 per cent. complete. In one year the completed mileage has grown to 17,716 miles, an increase of more than 10,000 miles, and there still remain under construction 14,513 miles which are estimated as 56 per cent. complete. The federal aid earned by the states on completed and uncompleted pro-

jects amounts to \$194,560,135, of which \$166,911,552 have actually been paid.

The total length of projects in all stages, including those which have been completed and those which are in the stages preliminary to construction, is 39,940 miles. Of this mileage, as stated above, 17,716 miles are completed, 14,513 are under construction and the balance of 7711 miles is in the preconstruction stage.

The roads brought to completion during the year average over 200 miles for each state. The greatest increase in completed mileage is in Texas, which has added during the year 933 miles to her completed highway. But Texas owes its leading position largely to its size. The states of Arkansas, Georgia, Iowa, Minnesota and North Carolina, each with an increase of more than 500 miles, and Montana and Wisconsin, with more than 400 miles, made notable advances toward the goal of a completed highway system.

A number of smaller states, such as Louisiana, Maryland, Massachusetts and Rhode Island, made very substantial increases in proportion to their size, though some of them were prevented from adding as largely to their mileage as they otherwise would by the fact that they had practically expended all the federal aid available to them before the passage of the federal highway act and were unable to initiate new projects. This is notably the case with respect to Delaware, which has not increased its completed mileage at all.

The largest payment of federal aid during the year also went to Texas, which received from the government \$5,915,046 and earned nearly \$2,500,000 more. Other large payments were made to Illinois, Iowa, Ohio and Pennsylvania, each of which received from \$4,000,000 to \$5,000,000 or more during the year.

Something of the magnitude of the task that is being accomplished is in these significant totals. The mere size of the job and the celerity with which it has been carried forward are made clear in fullness of detail in the statistical tables which are printed on other pages.

The Value of the Roads.

But merely to say that this year has added 10,000 miles to the previously existing mileage conveys no adequate sense of the far-reaching effects of the work that is being done. The 10,000 miles completed represent something more than the equivalent of three transcontinental roads. They are not transcontinental roads. They are not even connected roads, though as the work continues they will be connected; but each separate project is to some community a new opportunity, a means of bettering, in some respects, the economic and social status of the community, and together they form the links which, eventually united, will constitute a new means of transportation, no less important to the country as a whole than that offered by the railroads.

What they mean to the localities in which they are constructed can only be told by example. For example, then, there is the federal aid road from Helena in Arkansas to Old Town, 17 miles away on the Mississippi. When last spring the river rose and threatened to spread over the whole of that low country in Arkansas in a destructive flood, word came to Helena that the levee at Old Town was about to break. The situation was critical. A few hours delay and thousands of acres of rich farming land would be flooded. Helena was the only source of aid and many men with tools and material were needed. Every available motor vehicle was pressed into service and over 600 men, equipped for the work ahead were in a short time speeding over the new road to the levee. They arrived in the nick of time and by almost superhuman efforts dammed back the rising waters. There is no question in the minds of the people of Old Town and Helena about the value of their new federal aid road. They are sure that if they had been dependent upon the old road the help so desperately needed could not have reached the levee in time.

Out in Arizona there is another road that is drawing near to completion. It will connect Supe-

rior and Miami, two of the largest and most important towns in the copper country. By the old road the distance between them is a full hundred miles. The new road, tunneled in places through solid rock, will shorten the distance by eighty miles.

In Alabama the plans have been drawn for a new federal aid project between Ariton and Clayton. The old road between these towns, which are 25 miles apart, crosses the railroad 14 times in that distance. By a piece of excellent engineering 13 of these crossings have been eliminated and the one remaining is not dangerous.

In Maryland there was one particular curve on the road from Baltimore to Washington so deadly that it was known throughout the state as "Dead Man's Curve." It was what is known as a reverse curve, there was a heavy grade, and high banks obscured the view from both directions. Hundreds of automobiles had been wrecked because of this curve and there was a record of 35 deaths charged against it. The dangerous condition has now been eliminated by the state with federal aid, and though it was necessary to spend \$17,000 in less than a quarter of a mile, none of those who use the road need to be convinced of the wisdom of the expenditure or the value of the improvement.

In Illinois the Lincoln Highway has been improved for almost the entire distance across the state, from Chicago to Clinton, with federal aid. So also has been the old national pike from Marshall at the eastern line to St. Louis at the west. Another trans-state road has been built from Chicago to Rock Island, with a branch southward to St. Louis; and a branch from the old national pike runs southward to the bridge at Cairo. Together these roads form the principal trunk lines of the state, and they have been improved almost entirely as federal aid projects. There can be no doubt in the minds of the people of Illinois as to the value of this work, which has given them in the brief space of six years a major network of magnificent highways covering the whole state.

A number of important bridge projects have been brought to completion during the year, among them the bridge over the Missouri river between Bismarck and Mandan, N. D. This is the only highway bridge over the river north of Yankton and is one of the notable bridge structures recently built in this country. Another bridge of importance has been completed over the Apalachicola river at River Junction, Fla., the only highway bridge across that stream south of Columbus, Ga. In Missouri there has long been need for several bridges to span the lower Missouri and connect the two sections into which the state is divided by the river. The lack of these crossings has been a most serious obstacle to communication, and the proposals submitted by the state for the construction of several bridges just before the close of the fiscal year are therefore of great interest to the people of the state.

These are merely instances of hundreds and thousands of improvements in every state, each of which is a significant forward step in the local community and the sum total of which will eventually mean to the United States all the difference between the costly, unsafe and intermittent highway transportation of the past and the unhampered, economical, convenient and safe transportation which the developing system of roads will eventually make possible in all sections.

The Character of the Roads.

The federal highway act imposes only one condition upon the character of the roads to be built under it that has not obtained in the work under the earlier federal aid road act. That condition is that the primary or interstate roads shall have a width of surfacing of at least 18 feet, unless certain well defined conditions render such a width impracticable. This provision of the act has been strictly adhered to in the approval of projects submitted since the passage of the act and no difficulty is anticipated in the future.

The principles that have governed the character of the roads built, as to grade and drainage and type of

surfacing, are not affected by the new act, and the bureau is continuing to approve surfaces of all types, the only condition being that the type selected shall be consistent with the traffic requirements under the climatic and soil conditions prevailing.

The division of the roads of the system into primary and secondary classes does not imply that all roads of the primary class are to be surfaced with a higher type of material than the secondary roads. On the contrary, it is to be anticipated that primary roads in some sections of the country, notably in many of the southern and western states, will not require a higher type of surface than the secondary roads in other sections—for example, New England and the industrial East.

In many instances it has been found advisable to grade and drain a road and delay an expensive pavement until a later time. This policy will be continued under the same conditions; that is, when the volume of traffic at the time of original construction is not large enough to require any better surface than can be built of selected soil, sand clay or gravel, when financial considerations require that the expense of a pavement be deferred, and when, as in the light of past experience it has often been found advisable, a delay to allow the subgrade to become stable is believed to be necessary. In such cases the plan will be, as it has been in the past, to so design and construct the grades and drainage structures and whatever temporary surfacing that is applied, that any additions or subsequent improvements can be made without loss of prior investment.

The increasing number of accidents at highway grade crossings has become a matter of grave concern, and has led to adoption of a policy looking to the elimination of such dangerous crossings wherever practicable on federal aid roads. The policy, which has met with the generous support of the states, is that all existing grade crossings on the federal aid highway system shall be classified for priority of elimination

by agreement between the bureau and the state highway departments, and the improvements shall be carried out as rapidly as practicable.

Road Material Tests and Research.

As previously mentioned, the activity in research and the promising results that have been obtained have been outstanding developments of the past fiscal year. To some extent the bureau has been associated with practically all the major investigations that have been in progress.

The research carried on by the division of tests at the department experimental farm at Arlington, Va., is regarded not only as the most important function of the division, but as one of the most valuable services the bureau is performing.

Road design has until recently been almost entirely a matter of judgment and precedent. Even when the probable weight of the traffic that would follow improvement has been ascertainable, and the climatic and soil conditions have been known with a fair degree of definiteness, the lack of definite knowledge of the effects of these factors upon the road has prevented the employment of such scientific methods of design as have been applied to other engineering structures. The purpose of such investigations as are now being conducted is to develop such methods of road design, and though the results thus far obtained are indicative rather than conclusive, certain fundamental principles are gradually being evolved that ultimately will form the basis of scientific methods and permit the design of more durable and economical roads.

The investigations at Arlington include the measurement of motor truck impact on highway surfaces, determination of the resistance to impact of various kinds of road surfaces, the drainage of subgrades, the characteristics of subgrade materials, the study of the warping and movement of road surfaces due to natural causes, accelerated tests of various surfacing materials to determine their resistance to the wear of traffic and bridge investigations, including the distribution of stress in skew arches and the impact stresses

set up in bridges by moving loads.

To the State Highway Department of Illinois and the Highway Commission of California, cooperating with the Columbia Steel Company of Pittsburg, Cal., the country is indebted for two researches, conducted at Bates, Ill., and Pittsburg, Cal., on a scale never before attempted. Both of these investigations had for their purpose the testing of actual road surfaces of various designs under actual traffic. By the boldness with which these tests were conceived and the thoroughness with which they were conducted the two state departments and the steel company have made the outstanding contributions of the year to the advancement of the science of highway engineering.

The researches completed last year at Arlington and those at the Bates road in Illinois and at Pittsburg, Cal., in which the bureau cooperated, have thrown considerable light on the traffic resisting qualities of road surfaces of different designs laid on various subgrade materials, and have led to certain tentative conclusions as to the proper thickness of slab for different weights of vehicle. Immediate results are apparent in the altered standards of design in some states, and as the information is gradually disseminated other states will no doubt follow. Results of the motor truck impact tests are being used as the basis for the amendment of laws governing the weight of motor vehicles.

There is still need, however, for much more investigation. Information is badly needed as to the physical characteristics of subgrade materials which are causing certain roads to give short service, the proper manner of draining soils of different types or their possible treatment with admixtures of stabilizing materials, and the relative strength of bituminous surfaces on concrete bases as compared with concrete slab surfaces.

Researches Conducted During Year.

In addition to the motor truck impact and subgrade investigations continued from the previous fiscal

year, the following specific researches have been carried forward during the year:

Preparations have been completed for the investigation of relative wear of different concrete surfaces. These surfaces are constructed on a circular track 625 feet in circumference, in which there are 62 sections of different qualities of concrete. These will be subjected to the wear of a rubber tired truck and the results will be compared with physical laboratory tests.

Another circular track has been surfaced with bituminous mixtures of different qualities. These sections will be subjected to actual motor truck traffic for the purpose of studying their stability and determining the laws governing the stability of bituminous mixes. This investigation has been instituted with the idea of rendering bituminous roads less likely to wave under traffic.

Special studies have been conducted in the field for the purpose of analyzing the causes of rhythmic corrugations in gravel roads with a view to their prevention. This is a most important subject, in view of the large mileage of gravel roads already built. In connection with this work a laboratory study of gravel is being made.

Investigations of the warping and movement of road slabs as a result of temperature changes, frost, moisture and other natural causes have been carried on at Arlington.

Two bridge investigations have been instituted, one consisting of the measurement of impact stresses and the other aiming to throw light on the design of skew arches. A special photographic strain gauge has been developed which permits of the very accurate determination of impact stresses.

A field investigation of various types of culvert pipe in the southern states has been completed.

Researches in Connection with Non-bituminous Materials.

The following researches have been conducted in connection with the use and characteristics of non-bituminous materials: A study of

the effect of alkali in mixing water on the strength of cement mortar; a method of treating concrete drain tile with water gas tar has been developed which seems to greatly retard the destruction of this kind of tile by alkalis. Analyses were made of 160 concrete sands for the purpose of determining to what extent the color test for organic content is dependable. An impact test was developed for the purpose of determining the quality of gravel aggregates, and an investigation was carried on in cooperation with the American Society for Testing Materials with the object of standardizing a compression test for rock.

In connection with the accelerated wear test which is to be conducted at Arlington a series of abrasion tests were made on samples of crushed stone, gravel, sand, slag, chats, etc., from various parts of the United States. These aggregates, which have widely varying qualities, are to be used in the construction of the experimental concrete road sections, and by correlating the results of the two series of experiments it is believed that it will be possible to establish a relation between the quality of aggregates and the wear of the pavement.

Research in Connection with Bituminous Materials.

Investigational work on bituminous materials has been concentrated upon bituminous mixtures such as are used in the construction of bituminous concrete and sheet asphalt pavements. A number of projects are under way which will lead to a better knowledge of the essential characteristics of such mixtures and of suitable methods for testing their qualities.

To supplement the special tests of bituminous concrete pavements which will be made at Arlington to determine the cause of wavy surfaces, a study of asphalt pavements has been instituted in five important cities in which different climatic conditions prevail. This study will be conducted in cooperation with the street departments of the cities and the asphalt association. It will involve a comprehensive series of

tests of a large number of samples taken from typical streets. The testing, which is now well under way, is designed to determine the characteristics of sheet asphalt mixtures that render them susceptible to the formation of waves.

In addition a laboratory study of bituminous mixtures is in progress to study methods of testing and determine essential qualities of such mixtures as are used in highway construction.

A number of investigations on oils, asphalts and tars have been carried out, particularly as to the methods of making the fixed carbon tests, the results of the volatilization test as applied to road oils by two methods extensively used, and the consistency of refined tars as determined by means of the softening point and float test. The results of these investigations have been used in compiling specifications for suitable bituminous road materials.

A number of investigations looking to the standardization of various tests for the quality of bituminous materials have been made generally in cooperation with the American Society for Testing Materials and the American Association of State Highway Officials. A detailed study of the viscosity test has been undertaken and partially completed, and the method of conducting the float test has been standardized. Further work has been carried out in connection with the distillation test for bituminous road materials. The committee on tests of the American Association of State Highway Officials has held a number of meetings in various sections of the country at which the bureau has been represented, and a great deal of progress has been made in standardizing methods of testing to be applied to materials used in federal aid road construction.

Federal Aid Testing.

One of the important functions of the division of tests is the testing of materials used in federal aid road construction. The routine testing of such materials is performed in a large number of state highway laboratories and commercial laboratories

throughout the country. This is necessary in order that the work may be done expeditiously. It is highly important that such testing be performed in a standard manner and with skilled and careful operators. The division of tests, by the use of check samples and by personal visits to the various laboratories, aids in the establishment of standard methods of testing and gives information on the correct methods to be used. During the fiscal year 1160 samples of materials used in federal aid construction were received for testing, and personal visits were made to thirty-seven road materials laboratories performing tests on federal aid materials.

Investigations in Cooperation with Other Agencies.

In connection with its research programme, the bureau has established cooperative relations with other institutions, which give it the benefit of increased personnel and testing facilities at a comparatively low cost, and which will reduce the time necessary to complete the work. Under the cooperative arrangements the cooperating agency pays for approximately one-half of the cost of the investigation. During the past year such cooperative investigations have been conducted by Purdue University, Iowa State College, University of Maryland, University of Texas, Kansas Agricultural College, Massachusetts Institute of Technology, North Carolina State Highway Department and New Hampshire State Highway Department. We have also worked in cooperation with the Illinois and California state highway departments. The investigations conducted involve field investigations of sand clay roads, investigations of tractive resistance and laboratory investigations of the properties of road making materials.

Routine Testing of Bituminous and Nonbituminous Materials.

In addition to the federal aid samples tested, tests were made by the chemical laboratory upon 445 samples of bituminous material, 160 samples of metal and forty-two sam-

ples of miscellaneous materials. The nonbituminous testing laboratory examined 1283 samples of various materials, including rock, sand, gravel, cement, concrete, slag and brick. In the petrographic laboratory 991 samples were examined, including 431 samples of rock, 262 of gravel, 239 of sand, nineteen of clay, thirty-seven of slag and three miscellaneous samples. In addition, the petrographer conducted a special investigation of the microscopic portions of certain subgrade materials, in connection with which a special dye absorption test was developed for investigating the clay and suspension clay portions.

Economic Investigations and Research.

Recognizing the necessity of centralizing research in the fields of highway transportation, finance and valuation plans have been made for the organization of a division of highway economics as a separate division of the bureau beginning with the new fiscal year. A certain amount of investigational work has been done along these lines, but for the last three years there has been no special section of the organization charged with the responsibility of that particular kind of work.

This year several very satisfactory studies have been made directly under the office of the chief of bureau, the most prominent of which were two traffic surveys conducted in cooperation with the Connecticut State Highway Department on the Boston Post Road and the road from Hartford, Conn., to Springfield, Mass. The survey on the Boston Post Road was made near Greenwich, Conn., and that on the Hartford-Springfield road was made near the Massachusetts line. Certain very illuminating data with regard to the weight and number of vehicles, the character of commodities transported by highway and the length of haul by highway were obtained in those studies.

During the summer of 1921 a survey of highway traffic, finance and valuation was conducted in cooperation with the University of Tennessee and the highway department of

that state in several Tennessee counties.

Both of these surveys, their scope somewhat extended, will be continued during the next fiscal year, and it is expected that the Connecticut survey in particular will produce traffic data records on a scale never before attempted. The survey will include the recording of vehicle traffic and the movement of commodities over the highways of the state for a period of a year, and it is hoped that it will provide much of the highway transport data so fundamental in the solution of modern highway problems.

During the spring of 1922 a survey was made in four Wisconsin counties of the total highway funds raised from all sources of revenue. This analysis, the purpose of which was to yield a better knowledge of the distribution of the burden of highway construction and maintenance costs to various classes within a community, included a comparison of urban and rural contributions to highway improvements. Financial researches are now in progress designed to develop the fundamental principles of sound highway financing.

With the opening of the new year a complete survey of highway transportation, finance and valuation in California is planned to obtain fundamental data applicable to the Pacific coast states. A similar survey is to be conducted in a typical agricultural region. In this survey emphasis will rest upon the movement of produce from farm to market.

Surveys in transportation, finance and valuation are also contemplated in a combined industrial-agricultural state and a typical southern state. When the researches in Connecticut, an industrial state, in California, a Pacific coast state, in an agricultural state, a typical industrial-agricultural state and a southern state are completed it is hoped that a sufficient amount of highway transport data and financial and valuation data will be assembled to guide highway policies in states and sections which are comparable to the regions selected.

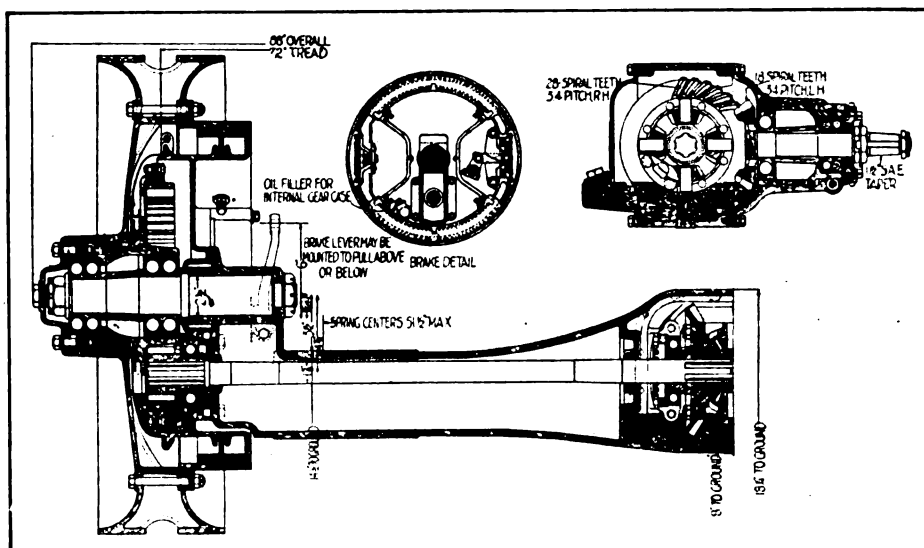
Atlas Announces New Axle

THE Atlas axle manufactured by the Atlas Axle Company, Wilmington, Del., is specially designed for motorbus service and other low center of gravity applications; such as furniture vans, rolling stores, trucks for hauling plate glass, empty barrels, cotton bales and similar bulky commodities.

The hub cap is cast integral and the insertion of an ordinary bolt in the tapped hole provided, results in a self-contained wheel puller of marked ease and simplicity. Removal of the wheel does not affect the bearing adjustment or internal gear lubrication.

Brake Drums—These are .60 carbon cast steel. Superior in their wearing qualities because of their hardness and absolute concentricity.

Brake—Single internal expanding; toggle actuated and full wrapping with cast shoes. Generous in proportions and efficient in action. Adjustable wedge to



New Type Axle Which Adds to Efficiency of Truck.

It affords the very desirable condition of an extremely low floor height without the necessity of kicking up the frame or undersliding the springs. In this the original "cranked" axle, the position of the differential housing off-set from the center of the wheel, results in ample clearance and permits a flat floor without domes, humps or other obstructions in it. A ground clearance of eight inches remains with 36 inch wheels. The propeller shaft angularity is not excessive.

SPECIFICATIONS.

Load Carrying Member—A one piece, hollow casting of box girder section, enclosing and protecting all driving members. It is very stiff and strong without being heavy. Deflection, even under severe overloading, is not possible. The wheel spindles are S. A. E. specification No. 3340 chrome nickel steel, properly heat treated.

Differential—Special Brown-Lipe-Chapin with spiral bevel drive gear and pinion mate. Accessible for bearing adjustment from the rear. Removable as a unit from the front.

Gear Mounting—Both the differential drive gear and the internal gears are splined to their respective carriers. This method of attachment relieves the usual attachment bolts of all torsional and shearing stresses and insures continuously quiet and true running gears.

Wheels—Essentially part of the axle and furnished for either solid or pneu-

take up lining wear without alteration of linkage.

Bearings—Ball bearings throughout are standard. The double row are S. R. B.'s and the single row, Gurneys. Timken or Hyatt roller bearings in the wheel hubs are optional.

Lubrication—All gears and bearings operate in an oil bath. There is not a grease or oil cup on the axle. The Atlas patented running joint at the wheel hub positively prevents any leakage. Brake shafts turn in graphite and bronze bushings.

Driving Strains—The axle is designed for Hotchkiss drive, but brackets for radius rods can be furnished.

Gear Specifications—Internal gears and jackshaft pinions are 4/5 pitch, 1 1/4 inch face, alloy steel and heat treated. Bevel drive gears are 3.4 pitch, 1 1/4 inch face, 3 1/2 per cent. nickel steel, heat treated. Pressure angle is 20 degrees.

Model L C 8—Permissible load on spring pads, 8000 pounds; tread, 72 inches; overall width, 88 inches; standard gear ratio, 6.6 to one; optional gear ratios, six to one and seven to one; spring centers, 3 1/2 inch springs, 51 inches maximum; spring pad height, 14 1/2 inches; ground clearance at differential, eight inches; pinion shaft end, S. A. E. taper, 1 1/4 inches; brake, single internal expanding, 3 by 21 inches; wheels, cast metal for 36 by eight solid tires or 36 by six dual pneumatics; approximate weight with wheels, 1150 pounds.

Model L C 12—Permissible load on spring pads, 12,000 pounds; tread, 73 inches; overall width, 89 1/2 inches; standard gear ratio, 7.1 to one; optional gear ratios, 6.4 to one and eight to one; spring centers, 3 1/2 inch springs, 53 inch maximum; spring pad height, 12 1/2 inches; ground clearance at differential, 5 1/2 inches; pinion shaft end, S. A. E. taper, 1 1/4 inch; brake, single internal expanding, three by 24 inches; wheels, cast metal for 34 by five dual solid tires; approximate weight with wheels, 1275 pounds.

SUPREME III TAKES LAST RIDE

FROM Chicago to Washington in thirty-seven hours and thirty-four minutes, a distance of 825 miles over some of the worst mountain roads in the eastern section of the country is a record recently made by a GMC one-ton truck. The truck made this record non-stop run at an average speed of twenty-two miles an hour.

The truck was pressed into service to carry America's king of turkeys—"Supreme III"—the gift of the Harding Girls' Club of Morris & Company to President and Mrs. Harding for their Thanksgiving dinner.

The truck followed the National Old Trail road from Chicago to the Capitol, passing over the Dixie Highway to Danville, Ill., and thence on the Old Trail to Indianapolis, Dayton, Columbus, Wheeling, W. Va., and over the mountains to Cumberland, Md., and to the District of Columbia.

Due to the fact that the truck was driven day and night, it was necessary to use relay sets of drivers. When one pauses to think of the guelling strain to which all units of the truck were subjected by the run he gets an idea of their dependability.



GMC Truck Which Made Record Run to Washington.

Bruce Borland has been appointed consulting engineer for the Chicago Car Seal Company, Chicago.

Rex C. Willis, who was formerly tractor engine mechanical expert for the Standard Oil Company (California), San Francisco, has been made foreman in charge for Jones & Pitzer, Seattle, Wash.

James J. Dimeo has been made production manager for the Dura Company, Toledo, O. Until recently he was manager for Jaxon Company, also of Toledo.

Robert D. Easton has become chief engineer for the Brandt Manufacturing Company, Watertown, Mass. He was formerly designer and engineering draftsman for the General Tractors, Incorporated, Chicago.

F. J. Scarr, until recently assistant superintendent of motor vehicles for the Standard Oil Company (New Jersey) at Baltimore, has been appointed transportation engineer for the Motor Haulage Company, New York City.

Ralph B. Burton has accepted a position with the White Motor Company, Cleveland.

J. A. Howlett has been made service manager for Gray-Dort Motor Sales, Chatham, Ontario.

W. L. Scribner has become associated with the Coats Steam Car Company, Chicago, and is located at the sales office in Columbus, O.

Carroll M. Aument has accepted a position as engineer with the International Motor Company, New York City.

Thomas Jackson, who was formerly draftsman for the Holt Manufacturing Company, Peoria, Ill., has accepted a similar position with the Russell Motor Axle Company, Detroit, Mich.

John F. Palmer has become affiliated with the Hewitt Rubber Company, Buffalo, N. Y.

With the Engineers

Charles W. Claassen has accepted a position as service manager for the Bauer Auto Sales Company, Cincinnati, O.

R. W. Cory is now affiliated with the Western Electric Company, Chicago.

Albert F. de Maringh has accepted a position as sales manager for the Thermo Vacuum Systems, Detroit. He was previously sales engineer for Marburg Brothers, Incorporated, New York City.

Louie F. Koellner, who was until recently draftsman for the Fulton Iron Works, St. Louis, has accepted a similar position with the Traffic Motor Truck Corporation, also of St. Louis.

Joseph W. Bramwell has made arrangements with the National Scale Corporation, Chicopee Falls, Mass., whereby he will represent it in Philadelphia.

Fred W. Warner has become affiliated with the Durant Corporation, Pontiac, Mich. He was previously president and general manager of the Oakland Motor Car Company, also of Pontiac.

Clifford H. Dengler, formerly head engine designer for the Fox Motor Car Company, Philadelphia, is now associate engineer with the Automotive Engineering Consultants, also of Philadelphia.

Cyril Rhodes has joined the engineering department in Plant No. 1 of the Studebaker Corporation of America, South Bend, Ind. He recently attended Cornell University, Ithaca, N. Y.

F. B. Farquharson has accepted a position as draftsman with the Kirsten Boeing Engineering Company, Seattle, Wash. He formerly attended the University of Washington, Seattle.

A. J. Langhammer has been appointed mechanical superintendent of the C. G. Spring & Bumper Company, Kalamazoo, Mich. He was formerly consulting engineer for Thompson & Worley, Detroit.

D. C. Fleming has been appointed district service and sales manager for the Phelps Light & Power Company, Rock Island, Ill. He was formerly superintendent of instruction in the automobile school maintained by the Young Men's Christian Association at Davenport, Ia.

George W. Winkquist has joined the engineering department of the Panama Power & Light Company, Panama, Republic of Panama. He previously attended the Rensselaer Polytechnic Institute, Troy, N. Y.

Ernest F. Carlson is engaged in testing work in the power plant of the Minneapolis Street Railway Company, Minneapolis. He formerly attended the University of Minnesota.

Charles E. Stoddard has severed his connection with the American Steam Truck Company, Chicago, where he was doing designing and laying out steam passenger cars. He has not announced his plans for the future.

F. H. Marmon has become associated with the Nordyke & Marmon Company, Indianapolis. He attended the Massachusetts Institute of Technology, Cambridge, Mass., until recently.

Walter E. Dugan, formerly manager of the Cincinnati axle plant of the Standard Parts Company, Cleveland, has been elected vice president and general manager of the Shulex Axle Company, Louisville, Ky.

P. R. Sandieson, who was formerly engineer for the Pittsburgh Model Engine Company, Pittsburgh, has become associated with the Standard Steel Car Company, Butler, Pa.

Cooperation Versus Competition Between Motor Truck and Railroad*

(By W. H. LYFORD, Vice President, Chicago and Eastern Railway Company.)

THE transportation of goods is an absolutely essential requirement for the family, industrial and commercial life of a civilized people. The furnishing of transportation is sometimes considered a function of the government, but the people of the United States will not permit the government to perform transportation, except through the mail service and for packages weighing seventy pounds or less. All other transportation of goods must be performed by the person requiring it, or by a carrier for hire. This discussion will be confined to highway and railway transportation of goods for hire.

Transportation is not completed until the goods are moved all the way from the premises of the shipper to the premises of the consignee and, for brevity, we will call such movement "complete transportation." Also for brevity we will use the British term "trader," which includes both shipper and consignee, or all persons for whom transportation of goods is furnished for hire.

THE trader is concerned only with complete transportation. His greatest need is that complete transportation shall be furnished with regularity and within reasonable time. His secondary need is that the charges which he must pay for complete transportation shall not be more than the traffic will bear, without curtailing his profitable trade.

Complete transportation cannot be furnished regularly and promptly unless the charges of the carrier are high enough to pay all of the expenses of carriage and a profit sufficient to warrant the investment of capital and energy in the installation of the transportation service and in increasing the service as traffic increases. In normal times the volume of freight traffic in this country increases at a rate of not less than six per cent. per year.

The trader is entitled to the best transportation service which can be furnished for the charges which he pays and it is the duty of carriers who, singly or jointly, undertake to furnish complete transportation, to make their charges as low as is consistent with the maintenance of adequate, regular and prompt service.

Four Classes of Transportation.

We are accustomed to think of the transportation of goods as divided into four general classes: parcel

PERTINENT FACTS.

"The most important field for cooperation between the railway and the truck is offered by collection and delivery of l. c. l. freight in large cities."

"The combined l. c. l. freight of all the railways reaching a city could be collected and delivered by a properly equipped single trucking organization, working in full cooperation with the railways, at less cost than is now paid by the traders in that city for their cartage, and still yield a valuable profit to the trucking organization."

"Another field for the profitable use of the motor truck is the transportation of freight between communities which are served by branch lines of railway, on which the traffic is too light to pay the expenses of any kind of railway transportation."

"Unless there is a radical change from present practices in railway transportation in the United States, our great transportation system, which is the wonder of the world, will become a hindrance to the further progressive development of this country."

car load and l. c. l. freight is that car load freight is loaded and unloaded on an industry track or a team track by the trader, or by some one employed by him, while l. c. l. freight is loaded and unloaded and passed through a station, at the expense of the railway. Consequently, car load rates are substantially less per ton than l. c. l. rates for carrying the same goods.

Collection and Delivery.

Whether the government, the express company or the railroad company undertakes to transport the goods, the railway actually performs the entire transportation service, except the movement between the premises of the traders and the stations of the railway companies. Such movement is called "collection and delivery." Parcel post is not collected, but is delivered by the government. Express is collected and delivered by the express company. Freight is collected and delivered, not by the railway company, but by the trader or by the owner of trucks or teams, whom we will call "the trucker."

Because the railway does not furnish collection and delivery and that service must be performed by or at the expense of the trader, the traders have located their industries as close as possible to railway stations. Consequently, the vicinity of the freight station is usually a congested district in any large city. If the railway furnished collection and delivery, the location of the freight sta-

post, express, less-than-carload or package freight (commonly called l. c. l.), and car load freight.

The essential difference between

(*An address delivered at the Second National Conference on Education for Highway and Highway Transport Engineering, held under the auspices of the Highway Education Board, at Washington.)

tions would be immaterial to the trader. A distance of two miles between the locations of two stations in a large city may make a difference of 300 per cent. in the interest charges on the real estate occupied by the stations. In Chicago the interest charge alone on real estate at Twelfth street, on which a freight station is located, is more than \$2.30 per ton of freight handled through the station. If the station were located at Thirty-third street, such interest charge would be reduced to about eighty cents per ton. The amount of interest saved by moving the station to Thirty-third street would pay the cost of well organized cartage between the Thirty-third street station and the premises of the trader. The present cartage charges would be saved.

Could Eliminate Large Stations.

Outbound freight is moved to the station in whatever way and at whatever time the trader chooses, during the business day. Inbound freight is removed from the railway station in whatever way the trader chooses and, on the average, about three days after the freight arrives. Therefore, the station becomes a storage warehouse, congested with piled-up freight awaiting delivery to the trader, at his convenience. With collection and delivery service controlled by or in full cooperation with the railway, large freight stations with storage facilities would be unnecessary. A narrow platform, with a roof over it and with tracks on one side and a highway on the other, is all that would be required.

With very few exceptions railway freight stations in large cities already are so congested that, unless we can find some way to pass more traffic through the existing facilities, or to keep on enlarging and multiplying them, by extravagant expenditures for additional real estate and track connections, the railways will not be able to handle the normal increase in freight traffic.

Railway companies are organized to furnish transportation. Storage is a separate field for enterprise. The public warehouse is needed and should be fostered because it can be

operated at a profit. Storage in railway stations rarely is profitable to the railway company and it seriously interferes with the legitimate function of the railway to furnish transportation.

Limitations.

The fields within which complete transportation of goods can be furnished by highway alone or by railway alone are limited.

There are very few industries or residences in the continental United States which are not connected with each other by highway and it is physically possible to perform complete transportation of goods by highway, between almost any two industries or residences. But such transportation is most economical only when limited to the movement of goods between homes or industries which are within reasonable trucking distance from each other. The determination of such reasonable distance depends on many conditions and a competent truck expert will place it anywhere between twenty-five and 150 miles. Of course there are emergencies and peculiar industries conditions which, in rare cases, make trucking economical over a distance of several hundred miles, but such cases are negligible in the consideration of the whole field of highway transportation.

On the other hand, comparatively few industries and practically no residences are connected with each other by railway. Therefore the field for complete transportation of goods by railway is restricted to the movement of car load freight between those industries which have direct rail connections. In that limited field the railway is the most economical means of transportation. A fair example is the movement of coal from a mine to an industry located on a side track.

Competition.

In this country, four different agencies are competing with each other for the transportation of the same goods; parcel post, the express company, the railway and the trucker. While the parcel post and express are transported over railways, the government and the express

company compete with each other and with the railway for the carriage of packages weighing seventy pounds or less, and the trucker competes with the three other agencies.

Competition for the local carriage of goods within city and suburban areas ought to be welcomed by the railways, as they perform this service at an actual loss, while the trucker can perform it at a profit. On the other hand, competition with the railway for the carriage of goods through rural districts, along main lines of railway, is harmful to the railway and unprofitable to the trucker.

Cooperation.

For parcel post there is complete cooperation between railway and highway transportation, as the government has its own cartage system. There is like cooperation in the express business, as the express company operates its own trucks and wagons. For freight traffic there is hardly any cooperation between the railway and the motor truck.

I have marshalled the foregoing facts without any idea that they would be new to you, but that they might form a background for the statement: That unless there is a radical change from present practices in railway transportation in the United States, our great transportation system, which is the wonder of the world, will become a hindrance to the further progressive development of this country.

Five years ago, when our railway system was placed under federal control, its march of progress was halted and it has never regained its stride. Its development has not kept pace with the industrial development of the country, because its revenues have not been sufficient to attract the additional capital necessary to finance the cost of normal additions and betterments to road and equipment.

The public is clamoring for lower rates, while existing rates are not high enough to produce the net railway operating income which, as determined by the Interstate Commerce Commission, the railways are entitled to earn. Still the tendency

of the commission is to reduce rates and there is no reasonable hope of increasing them.

Disregarding the temporarily bad condition of railway equipment resulting from the existing strike of the shop crafts, the only limitation on the volume of traffic which the railroads can move is due to the railway terminal facilities which are inadequate to take care of the traffic which easily could be transported over the main lines of railway.

Must Reduce Terminal Costs.

Under existing rates the line haul of freight would be highly profitable if the revenue therefrom were not absorbed by constantly increasing terminal expenses. If the railways are to remain solvent and carry the traffic for which rail transportation is demanded, they must find a way, first, to reduce terminal expenses, and second, either to enlarge their terminal facilities or to pass more traffic through the existing facilities. How to do these things is in my opinion the most important problem before the American people. I have devoted to it all the time I could spare from my regular duties during the past fifteen years, and have arrived at the definite conclusion that the problem can be solved only by remedying the following evils:

First—Too low compensation paid to the railways for carrying parcel post and express on expensive passenger trains.

Second—Lack of organized collection and delivery service, which lack makes it necessary to furnish unreasonably large and expensive freight terminal facilities, and an unreasonably large supply of freight cars.

Third—The use of box cars for the transfer of l. c. l. freight between railway stations in large terminal areas. The trucker could perform that necessary service more quickly and economically. Thousands of box cars thereby would be released from an unprofitable service and would substantially increase the carrying capacity of the railway.

Fourth—The use of box cars as trap cars, for moving l. c. l. freight through terminal areas for indus-

tries which have rail connections, and the iniquitous absorption by the railways of trap car subway and lighterage expenses, which is equivalent to furnishing free cartage to the favored few large traders, in discrimination against the average trader, who is obliged to provide or pay for his own cartage.

Fifth—The operation of branch lines on which the traffic is too light to sustain railway transportation and which could be served better and at far less expense by the motor truck.

Advantages of Cooperation.

The most important field for co-operation between the railway and the truck is offered by collection and delivery of l. c. l. freight in large cities. Comparatively few trucks are used in this service, first, because there is no cooperation between the truckers themselves, and second, because there is no cooperation between the trucker and the railway. As the collection and delivery of l. c. l. freight in large cities is now conducted the delays to trucks in reaching the station door and in loading and unloading the truck, make unprofitable the use of the truck in station service, so that by far the greater part of this service is performed by horse-drawn vehicles. Truck transportation is only profitable when the truck can be kept moving the greater part of the time.

Notable experiments have been tried in the United States for handling the collection and delivery of the freight of one railway company in a large city and, so far as I have been able to learn none of them have been successful. No single railway company receives and delivers freight from and to every part of a large city in sufficient volume to make profitable the collection and delivery of such freight by a trucking organization. I am satisfied, however, that the combined l. c. l. freight of all the railways reaching a city could be collected and delivered by a properly equipped single trucking organization, working in full co-operation with the railways, at less cost than is now paid by the traders in that city for their cartage, and

still yield a reasonable profit to the trucking organization.

For many years the Canadian railways have furnished collection and delivery in the principal cities of Canada, under separate cartage tariffs. The president of one of the largest Canadian railways is my authority for the statement that his railway could not possibly handle its traffic through its present terminal facilities without well organized collection and delivery service.

British Transport Practise.

In England, Scotland and Wales, the railways are furnishing collection and delivery at practically all of their stations. Knowing this I devoted a few days last year and several weeks this year to intensive study of the collection and delivery service in England and Scotland, principally in the great cities of London, Manchester and Glasgow. I was given exceptional opportunities and assistance for the investigation at close range of the terminal operations of the principal English and Scotch railways. As you perhaps know, the general manager is the chief executive officer of a British railway. The several general managers with whom I discussed these problems in Great Britain were unanimous in expressing the following conclusions:

First—That the collection and delivery of freight, at terminal cities and in large industrial centers, by a single trucking organization, is absolutely essential to the most efficient operation of freight stations and that with such a trucking organization cooperating with it, the railway company may control the time of collection and delivery of freight and is able to operate its stations throughout the 24-hour day if necessary, and to use the same platforms and forces for handling inbound and outbound freight.

Second—That collection and delivery can be furnished under a separate tariff at rates high enough to produce an actual profit from the cartage operations, after paying all expenses, and low enough to induce 95 per cent. of the traders to avail themselves of the organized collec-

tion and delivery service rather than to perform it themselves.

Third—That in England, where the general conditions are substantially like those in New England, the railways and the traders have prospered under unified cartage systems, without any substantial additions to station facilities.

In all of these conclusions of the British railway managers I heartily concur and I believe they ought to be adopted by American railways.

Operations Here and Abroad.

Contrast the operations of a large terminal freight station in the United States with a typical British "goods" station.

In this country the inbound freight is handled over one set of platforms by one working force and the outbound freight is handled over another set of platforms by another working force. Each set of platforms and each working force is operated through the entire business day, as freight is taken away from the inbound station and received at the outbound station during the entire day. The inbound platform is piled up with freight awaiting delivery, interfering with the movement of freight across the platform. When the inbound cars are unloaded they must be pulled out of the station and set into the outbound station for loading the following day.

In a typical British station the same platforms are used to handle not only the inbound and outbound traffic, but also a third class of traffic and they are operated through the entire 24-hour day.

When the day force goes on duty at 8 a. m. a line of cars loaded with inbound freight is standing on one side of the station platform and a continuous line of trucks or "lorries" are backed up to the other side of the platform. The city is divided into districts and the freight for one district is loaded into one or more lorries, there being more lorries at the platform than there are districts in the city. As soon as a lorry is fully loaded a driver is summoned by telephone from a nearby stable. He comes with a heavy Clydesdale horse and drives away with a three-

ton load to the proper district, where he makes delivery. When one lorry is loaded and driven away, another empty lorry is backed into its place, loaded and driven away.

Station Kept Clear at Noon.

Before noon all of the inbound freight has been removed from the cars and delivered by lorries. At 1 p. m. the station platform is clear and ready to receive the outbound freight which is collected and delivered at the station by the same drivers who delivered the inbound freight in the forenoon. All of the outbound freight is collected before 5 p. m., loaded into cars and dispatched before midnight. The platform is again clear and ready to receive the heavy fish and vegetable traffic which begins to arrive at 1 a. m. and is delivered at the markets before 6 a. m. At 8 a. m. the platform is again clear and the empty lorries are standing at the platform ready for the inbound merchandise.

For collection and delivery in this country, demountable truck bodies, trailers or semi-trailers doubtless would be used instead of the British lorries and gasoline or electric tractors would be substituted for Clydesdale horses. On our station platforms we doubtless would use four-wheel trailer trucks drawn by electric tractors instead of the old-fashioned two-wheel trucks which are used in Great Britain. In fact, I left that country with the firm conviction that with our American methods applied to the British system of collected before 5 p. m., loaded into cars and dispatched before and better service would be rendered than is now rendered in Great Britain.

Three of the great English railways have combined their collection and delivery service in London with most satisfactory results and I was assured by the manager of the combined service that, if all of the railways reaching London would join in the combination, he could effect even greater economies than he had already accomplished.

Separate Tariffs Recommended.

I am well aware that the average railway manager in this country

fears to encourage the establishment of collection and delivery service because of the danger that the railway will be required to pay the cost of the service and thereby increase the terminal expenses. I would not recommend that the collection and delivery service be forced upon the trader, but rather, that it be offered to him under separate cartage tariffs at rates which would be less than the trader's present cartage expenses. I believe that the result would be the same as it has been in Canada and Great Britain where the collection and delivery service has been accepted voluntarily by a large majority of the traders.

There is a second field for cooperation between the motor truck and the railway which would require a more radical departure from present methods than the one just mentioned, but which would produce even more beneficial results to all parties concerned. It is the organized delivery of car load freight from public team tracks in large terminal areas.

As already stated, this freight is now loaded, unloaded, collected and delivered by the trader, or at his expense. In different cities the trader is allowed from two to five days within which to unload cars after he has received notice that they are ready to be unloaded.

Generally speaking, there is a shortage of team tracks in the central districts of large cities and it is next to impossible for the railroads to furnish additional team tracks. Cars must be held in the outer yards until there is room for them on the team tracks, and then they must be held on the team tracks until it is convenient for the trader, or his trucker, to unload them. The necessary consequence is that large terminal districts are full of idle cars, and I think it is safe to say that the average time that box cars are delayed at the port of New York and in the switching district of Chicago is ten days per trip. If all of the freight cars which carry loads into port of New York, the switching district of Chicago and other large terminal areas, could be unloaded on

the day of their arrival, they could be loaded out on the same day, or the following day, and the present freight car equipment of the railways would be sufficient to meet all transportation needs for several years to come.

Competition Injuring Trader.

Competition between the railways to outdo each other in affording privileges to the traders has brought about a situation which is crippling the freight car supply and thereby is injuring the trader more than he is benefited by the allowance of an unreasonable time within which to load and unload car load freight.

At the present time there is a serious shortage of freight car equipment in all parts of the country. The railways, the commercial organizations and public authorities are urging the traders everywhere promptly to load and unload cars in order to reduce the idle time of freight cars and supply the crying need for more cars to move accumulated freight. Notwithstanding these appeals the car shortage is not being substantially remedied.

In my judgment a new system of delivering car load freight must be adopted and it will require the cooperation not only of the railways and the truckers, but also of the traders, warehousemen, the Interstate Commerce Commission and the State Utilities Commissions.

The rules relating to free time for holding loaded and empty cars, awaiting the convenience of the traders, should be so modified as to insure the unloading of cars within 24 hours after they are ready for unloading and the loading of cars within 24 hours after they are placed at the disposal of the trader.

Radical Change Suggested.

I realize that this is a radical change and would deprive the trader of a substantial amount of free storage which he has always enjoyed and would require him to pay warehouse charges on such inbound freight as he is unable to receive on the day of its arrival. This apparent disadvantage, however, could be, to some extent, offset by cheaper cartage furnished by an organized

collection and delivery service and the warehouse charges might be reduced substantially by cooperation between the railway, the trucker and the warehouseman.

The importance of cutting down the idle time of cars is shown by the fact, which I believe can be established, that the average time required by a freight car in car load freight service to make a round trip is about 20 days, and of that time the car is actually moving in line haul, loaded or empty, only 2 2/10 days, and it is actually earning revenue only 1 1/2 days out of the 20 days required for the round trip.

Branch Line Service.

Another field for the profitable use of the motor truck is the transportation of freight between communities which are served by branch lines of railway, on which the traffic is too light to pay the expenses of any kind of railway transportation. Such branches are almost innumerable and are scattered over every part of the country. They were built before motor transportation was perfected and, undoubtedly, they have performed a necessary public service, but they have outlived their usefulness. The transportation furnished over such branch lines could be performed better and more cheaply by motor conveyance over the public highways. No more such branch lines ought to be or will be constructed, if the trucker will take over the field and occupy it intelligently and efficiently. In recent years I have known of several cases where railways seriously have contemplated the construction of branch lines to reach small cities and towns, and on investigation have found that they could better afford to establish their own truck service, and the proposed branches have not been built.

I will go further and state that I think that all such money losing branch lines, along which transportation by truck over existing highways could be furnished at less expense, should be abandoned. The better and less expensive truck service should be substituted by the railroad company, if the trucker will not occupy the field.

Who Will Benefit Through These Changes?

Five parties are interested in bringing about the changes we have outlined:

The whole public would be benefited in that the city streets would be relieved from the congestion caused by wagons and trucks carrying small lots of freight to and from the railway stations. The new rural highways would last longer, as the cooperation of railway and truck would put an end to long-distance trucking.

The trader would get better service at less cost.

The motor truck industry and existing cartage companies and private truckers who would cooperate with the railways would vastly increase their field for profitable operation.

The warehousemen would profit by the addition of the storage now furnished by the railways.

The railways would cut down their terminal expenses and would increase their capacity for service.

The trucker has distinct advantage over the railway, in that highways are constructed by the general public, through some form of taxation, while the railway is constructed at the private expense of the railroad company.

Land Subsidies Justified.

In the early history of this country, public lands and moneys were contributed to a few railway companies, to induce them to build railways in territory which greatly needed transportation, but such donations have long since been repaid by the enhancement in the value of the taxable property, whose development has followed the railroad and would not have occurred without the railroad.

The railway, through taxation, pays a large share of the cost of constructing and maintaining highways, while the trucker pays no part of the cost of constructing or maintaining the railway. If the trucker is to compete with the railway, either he should pay a substantial part of the cost of constructing and maintaining the highway or the railway

LEGAL POINTS

By SAMUEL WANT

GARAGES, from various angles, continue to occupy the attention of the courts.

In a case just decided in Colorado the question involved was whether a particular structure constituted a violation of an ordinance prohibiting the erection of a "public garage" within the area in question, except under certain conditions that were not complied with. The proposed building was a structure subdivided into twenty-four separate compartments, and intended to be rented by the owner to as many individuals for the purpose of storing their machines under their own control, and under their own individual locks and keys.

The court said: "Is the building, then, a public garage? The popular acceptance of the term 'public garage' cannot be resorted to, for the reason that the definition given by the ordinance itself is, as it must be, controlling in this case. In this respect the ordinance reads as follows:

"For the purpose of this ordinance, a public garage is defined as any building or place used, in whole or in part, for carrying on the business of repairing or storing for hire of automobiles * * * or other motor vehicles."

"It is seen from this definition that the mere use of a building for storing automobiles does not make the building a public garage. To be a public garage it must be 'used * * * for carrying on the business of * * * storing for hire of automobiles.' If an owner allows the tenant of his building to store an automobile therein, the former is not 'carrying on the business of storing for hire of automobiles,' but is merely renting his building to be used as a private garage."

In another Colorado case the question was whether a garage was an "outbuilding" within the meaning of a building restriction prohibiting the erection of such structures. This garage was a one-story building, so constructed that the rear wall of the house constituted one of the walls of the garage. The court held that such a building did not violate the restriction in question. "No objection," said the court, "is made to the use to which the room is to be put, and we see no more reason for calling it an outbuilding than for so designating it if it were to be used as a kitchen or bedroom."

The spirit in which building restrictions are to be construed, as applied to the erection of a garage, is effectively presented by a decision just handed down by the Connecticut Supreme Court, involving the question whether a restriction against the erection of any outhouse within three feet of the side lines of lots was violated by the erection of a garage which was to be permanently attached to the rear of the house, and form a part of it. In this case the court said the aim

of the restriction "was to contribute to make the restricted property desirable as a location for a summer residence colony by forbidding erections thereon which might detract from its attractiveness or be deemed otherwise objectionable. Small structures scattered over the tract might well be regarded objectionable from an esthetic point of view, and structures devoted to certain uses might be offensive for more substantial reasons. At the time that the restriction was framed and imposed the classes of structures which might most reasonably be anticipated under the conditions then existing were barns where horses could be stabled, and privies, both objectionable for similar substantial reasons, and naturally expected to be erected, if erected at all, quite apart from the dwellings. Such other structures as might have been anticipated would neither in themselves nor in their use have been of a kind to be objectionable otherwise than esthetically. This would be true of the more modern garage, and it is scarcely conceivable that a garage appurtenant to a house, so constructed as not to give the effect of a separate building, and so attached to the house as to present the appearance of a part of it, could be considered objectionable from that point of view."

But these decisions do not alter the rule, stated in a preceding article that if a restriction is so worded as to prohibit the erection of any building within a certain area, a detached garage is within the prohibition.

INTERESTING questions as to the placing and shifting of responsibility for automobile accidents are presented in cases where the trouble occurs during a demonstration of an automobile by a dealer, or while a purchaser is receiving instruction from the dealer. In one case recently decided in New York it was held that a workman sent by an automobile dealer to demonstrate a car to a prospective purchaser was acting within the scope of his employment in acceding to the suggestion of the customer to permit his inexperienced daughter to drive the car. Accordingly the dealer was held responsible for an injury to a pedestrian due to the loss of control of the car by the daughter.

In another case where the owner of an automobile wished to sell it and sent his chauffeur to demonstrate it, the owner of the car was held liable for an injury caused to a pedestrian by the negligent operation of the car by an employee of the prospective purchaser.

The facts in a recent Kansas case were somewhat more complicated. An automobile was ordered by a dealer for a customer, supplied with gasoline, etc., and inspected and tested before noon of a

certain day. The customer called and paid for it in the afternoon, and drove it away. He returned shortly afterwards, and asked for someone to go with him to listen to the working of the car and make the necessary adjustments. During this trip, when the car was being driven by the purchaser accompanied by the dealer's machinist an accident occurred through careless driving. Upon this state of facts the court held that the responsibility for the accident rested upon the purchaser and not upon the dealer.

ON THE question of the proof of speed, in cases in which accidents are alleged to have been due to fast driving, or where a driver is charged with speeding, the courts take a common sense view of the means of proof that is in striking contrast to the technicalities governing most other fields of proof. Expert witnesses are never required.

An adult person of reasonable intelligence and ordinary experience in life is presumed to be capable, without proof of further qualification, to express an opinion as to how fast an automobile which came under his observation, was going at a particular time, and the courts have liberally admitted, as evidence of speed, the opinion of witnesses who actually saw the machine in motion at the time in question; and the force of such evidence does not appear materially to be weakened by vague expressions, such as that the automobile was "going like an express train" or that it went "very fast," the rate thereafter being estimated as being twenty-five or thirty miles an hour.

But when the speed of a motor vehicle is described by such general expressions as that it went "a good deal faster than a horse trots; it went 'pretty fast,' it has been decided that excessive speed is not proved, especially where the machine in question actually ran but little more than its length after striking a pedestrian.

ANOTHER textbook, dealing exclusively with the law of automobiles was published recently. It contains over 1300 pages, and deals with over 3000 decided cases. This branch of the law is growing in volume at a rapid pace. Its complexities, with the numerous risks of liability and loss to the automobile and truck owner, should be more widely understood, and a movement is already on foot to require all persons driving a car to acquire some knowledge of the essentials of the law as a prerequisite to obtaining a driver's license. Readers of this magazine who desire a list of the available books on the subject, or a discussion of some particular branch of the law of automobiles, are invited to write the editor. No charge is made for this service.

THE general principles of law which require one to act in such manner as to avoid injury to himself or others, and to take those steps to avoid accidents which would be taken by a reasonably prudent person under like circumstances, are not enforced in all their vigor as to situations of sudden danger. This is in recognition of the fallibility of human nature in sudden crises and the greater probability of errors of judgment occurring where a danger is imminent, and where a person is compelled instantly, without delaying for deliberation, to adopt some course of conduct to avoid injury.

The frequency of the use of automobiles on the public highways continually gives rise to situations which involve sudden danger, where one or more persons, without an instant's delay, must determine upon and adopt a mode of proceeding which will minimize the chance of collision and injury to themselves and others. Difficult questions of negligence and contributory negligence may be raised in adjusting controversies as to responsibility for accidents that occur under such circumstances.

Frequently a pedestrian may be compelled to act quickly when he suddenly sees an automobile approaching, and if he decides that he has sufficient time to escape in a given direction he will not necessarily be held to be guilty of contributory negligence, although his judgment is shown to have been erroneous and in consequence he is run down and injured.

But if a pedestrian deliberately attempts to cross in front of an approaching car, knowing that his chances of getting over to the other side in safety are about evenly balanced, he will be charged with having assumed the risk of injury, and in legal parlance he is deemed guilty of contributory negligence. This prevents him from obtaining damages for any injury he may sustain, even though the negligence of the motorist contributed to the accident.

On the other hand, the driver of the automobile may be held responsible for an accident if he turns from side to side, instead of stopping, when he finds that a pedestrian is confused and is not exercising sound judgment to avoid a collision.

In one case an automobile bore down on a horse and carriage that was in the act of turning about. One of the occupants of the carriage, seeing the danger of a collision, stood up and tried to jump to the road, and was seriously injured in the resulting fall. A calm review of the facts would have shown him that it was safer to remain in the carriage, and as a matter of fact the threatened collision was avoided, but the court held that the case was a proper one for an award of damages against the motorist.

A number of recent cases, arising principally in rural districts, deal with accidents to pedestrians and to occupants of other vehicles as a result of automobile races on public roads.

As to the participants in such contests, the law does not permit the recovery of damages for injuries sustained from collisions or other accidents, the view being

that these are incidents of the contests and that such risks are necessarily understood and assumed when the race is undertaken. Injuries to other persons, however, are on an entirely different footing.

Highways are constructed solely for public travel and their exclusive use cannot be granted, even temporarily, by a municipality to any individual or association for the purpose of holding races or endurance contests. Such a use of the streets amounts to a legal nuisance, and constitutes gross negligence as to any person who may be injured. City and county authorities cannot validly authorize such use, since they are trustees of the public highways for the benefit of the whole public. Indeed, in some cases where such permission had been given by special ordinance, and some persons were injured by the participants in the races, the court decided that the municipality was jointly liable with the participants for the violation of the fundamental rule of law previously referred to.

The above rules of liability, however, apply only in favor of persons who are using the roads in the usual course of travel. If people congregate on the side of the road to witness the race, they assume all the risks involved, and if they should be injured their right to damages would depend entirely upon their ability to prove that the driver of the racing car was guilty of some act of negligence that occasioned the accident.

THEFT insurance policies covering automobiles continue to come before the courts in a variety of cases involving the question what constitutes "theft" or "larceny" within the terms of such policies.

In a New York case the car was obtained from the owner by persons representing themselves as dealers in second hand cars. The machine was delivered to them for sale on a commission basis, and they absconded with it. Upon the ground that the owner voluntarily parted with his car, even though it was under misrepresentations and trickery, the court decided that the insurance company was not liable for the loss. But as pointed out in preceding articles the courts of most other states hold that the theft policy covers not only the usual character of theft, but also any fraudulent scheme whereby the owner is led through trickery or misrepresentation to part with his car, and as a result of which he loses it.

A NUMBER of additional controversies have recently come before the courts on the question of the right to erect a garage under various circumstances. In one case the erection of an addition to a dwelling for the purpose of housing an automobile was held not to be a violation of a restriction in the deed to the property prohibiting the erection of any building other than a detached dwelling house. But in another case the erection of a detached private garage was deemed a violation of a restriction against the erection of any building other than a dwelling house, although it was to be used exclusively as an appurtenance of a dwelling house already on the property. In a Massachu-

setts case the same result was reached where the restriction prohibited the erection of any building except a dwelling house "with the usual buildings appurtenant thereto." The case was decided quite recently, but the restriction in the deed antedated the day of the automobile. It is doubtful whether this narrow view will be accepted in other states in which the question may be presented.

In another case decided in Massachusetts the erection of a large garage was held to be a violation of a restriction against the erection of any building for shops or any business which shall be offensive to the neighborhood.

RUNAWAY horse teams still furnish interesting questions of legal responsibility where a collision with an automobile results. In a New York case where such a collision was presented the court decided that it was not necessary for the motorist to establish any act of negligence on the part of the owner of the team in order to obtain damages. The mere happening of the accident was enough to make out a case. But if the owner of the team can show that his horse was lead to run away through the acts of third parties, and that he had not been guilty of negligence on his own account, this would be a complete defense to the motorist's case.

THE Oregon Supreme Court has decided that it is not double taxation or otherwise unconstitutional to levy an ad valorem tax on all automobiles, and another license charge for the use of the highways. And an Arkansas case holds that the legislature may constitutionally impose a license tax on the owners of automobiles and in addition impose a tax of one cent a gallon on gasoline, the same to be collected by the dealer and accounted for to the state.

IN ANOTHER case decided in New York it was held that a prospective purchaser was not responsible for the negligent driving of his chauffeur, where he had instructed the latter to merely examine the engine of the car for the purpose of advising him as to whether a demonstration would be worth while, and the dealer permitted the employee to drive the car in making the examination.

A RECENT decision of a federal court applies the rule that if the purchaser of an automobile is underage, he may return the car to the dealer and demand the return of the full amount paid by him, less only a reasonable amount for the actual use made of the car while it was in the purchaser's possession.

A "PARK" is not a "parkway" within the meaning of automobile regulations. Accordingly where the law required motorists to keep to the right on streets divided longitudinally by a parkway, it was held not to apply to streets along the sides of a space 530 feet long, extending the length of a full city block, and used as a park by the public.

should be relieved of taxation for highway purposes.

If, however, the trucker, first, would perform that part of transportation furnished by the railway at an operating loss and on which the trucker could make a reasonable profit; second, would cease to compete with the railway for the traffic which the railway can carry at a profit and on which the profit of the trucker is very doubtful; and third, would cooperate with the railway in handling traffic which requires transportation both by rail and highway; in other words, if the truck would supplement the railway service instead of competing with it, then it would be to the interest of the railway that the expenses of the trucker should be reduced to the lowest possible limit, and, in my judgment, the railway could well afford to pay substantial taxes for highway purposes and to make no objection to the free use of the highway by the trucker.

There is a steady and, for the trucker, an alarming growth of public sentiment in favor of imposing upon the trucker a more substantial part of the cost of maintaining and renewing public highways, which, it is claimed, are destroyed by heavy trucks almost as fast as the highways can be constructed. If the public were satisfied that the truck was only used as a common carrier where the railway could not furnish as good and as cheap a service as the trucker furnishes, I believe the public would cease demanding that greater burdens be placed upon the trucker, which would increase the cost of his service.

No Single Scheme Universal.

No single scheme of operation will fit all terminal situations.

The situation at the port of New York seems to me to demand the use of motor trucks with demountable bodies or trailers to move the freight by way of ferries and city streets between railway terminals on the New Jersey shore and inland off-track stations in the different industrial centers of New York. The movement across the rivers is now made principally in freight cars on car

floats. By the use of ferry boats and inland off-track stations the railroads would be able to release large holdings of very valuable dock property on both sides of the rivers and such property would become available for the docking of ocean steamships for which there is great demand.

The inland stations could be constructed on much less valuable property and, if used as universal stations for all railways and steamship companies, they would offer superior advantages for upper floors which could be devoted to warehousing or other industrial purposes. I have been assured by New York real estate men of great experience that they would undertake to secure sites for such inland stations in all parts of New York and the construction thereon of buildings in which the first floors would be adapted for use as railway stations. They were willing to guarantee that the station floors would be leased permanently to the railway companies at nominal rentals on condition that the occupants of the upper floors might have access by elevators to the station floor for the receipt and delivery of freight, without any expense for cartage.

All this traffic now passes through the streets of New York. An organized truck service would substantially reduce the number of vehicles on the streets and the cost of the service would be much less than the expense of the present car float operations.

Collection and delivery of freight between the inland stations and the premises of the traders would be much more economical than the present cartage charges which the New York traders are obliged to pay.

Chicago Situation More Complex.

The situation at Chicago is more complex. The distances are so great and the railway systems so completely cover the city that I think the railways must supplement the truck service for movements over long distances.

In Cincinnati an organized truck service is in operation and conducts most of the transferring of freight

between the city stations of all the railroads centering there. All stations are equipped with the necessary machinery for handling loaded and empty five-ton demountable truck bodies, which are loaded and unloaded on the station platform and promptly moved by chassis, under the control of a truck dispatcher. This station to station service could easily be extended to the various industries. In fact, some of the largest traders in Cincinnati already have requested such extension of service.

At St. Louis organized motor truck service with trailers and semi-trailers has long been in operation between the freight stations at East St. Louis and inland stations in St. Louis. The service conforms closely to that outlined for the port of New York, except that the trucks cross the river on high bridges instead of ferry boats.

At St. Paul and Minneapolis the Great Northern and Northern Pacific railway companies for many years have used large box cars as freight stations for outbound l. c. l. freight, in different parts of both cities. When the cars are loaded they are switched to a common transfer station, about half way between the Twin Cities, and there the freight is transferred from the station cars to line cars for any destination on either railroad.

Conclusion.

The truck should supplement the railway and not compete with it. Wherever complete transportation can be furnished by the truck more efficiently and cheaply than by the railway, the truck should be used. Wherever the railway service is adequate and profitable and less expensive than truck service, the railway should perform the service. Where the best and cheapest service can be furnished profitably by railroad and truck combined, the railway and the trucker should cooperate in furnishing that service. The railway and the truck should keep out of each other's special territory and less expensive service.—Courtesy National Automobile Chamber of Commerce.

Conditions in the Tractor Industry

(Address by Finley P. Mount, President, Advance-Rumely Company, at the Meeting of the N. A. F. E. M., Chicago, Ill., Nov. 16.)

THEODORE ROOSEVELT is quoted as saying, "Every man owes something of his time to the upbuilding of the profession to which he belongs." If I were asked what this industry most needs, my answer would not be more orders, though these would be welcome enough, but more cooperation. When our country engaged in the World War no industry showed better organization and better cooperation than the manufacturers of agricultural implements, and no division of that industry was better organized than the Tractor and Thresher Department.

Since the depression which started two years ago, there has been even greater need for getting together on those things of common interest to our business and of mutual benefit to ourselves as manufacturers, to the dealers who handle our product, and to the farmers who constitute our great market. It is not saying too much to claim for the tractor manufacturers the very first place in the business of deflation.

THE whole agricultural implement industry has a record in this regard which can be mentioned with pride, but the power farming equipment industry stands at the head of the class, as is shown by the report of the Joint Commission of Agricultural Inquiry of the 67th Congress of the United States. In its report on the subject of Agricultural Implements this congressional commission makes the following statement with reference to prices of agricultural implements from 1913 to 1922 inclusive:

"From this it will be noted that the peak reached in prices of agricultural implements over 1913 or 1914 was 75 per cent., whereas the wholesale prices of all commodities reached a peak of 172 per cent. From investigations made by this commission it was also found that the present factory prices of agricultural implements, if power equipment and twine are not included, when compared with the prices of 1914, show an increase of 41 per cent. over the 1914 prices; if power equipment and twine were included in the computation, the increase of prices over those of 1914 would be less than 20 per cent., while the present prices of all commodities when compared with the prices of 1914 show an increase of 52 per cent."

If, therefore, the inclusion of power farming equipment is potent enough to reduce the price basis of the whole industry from 41 per cent. to less than 20 per cent., then it is obvious that the prices of power farming equipment have by the finding of this commission long ago reached rock bottom.

There is yet much to be done. Our experience during the last two years shows perhaps more than ever the need in the industry of uniform terms. We need a united policy on fair exhibits and tractor shows and demonstrations. We need a firm policy on courtesies in the field. We all have a peculiar interest in highways and highway laws. As manufacturers of threshers we are especially interested in the success and welfare of the custom thresher. We all want and hope some time to get a fair share of foreign trade. We are all interested in some better plan of financing tractor and thresher sales, and we are likewise in-

terested in selling and promoting the idea of power farming. We are intensely interested in transportation, for transportation when considered back to the beginning of all basic materials becomes one of the most controlling factors in our costs, and costs control our prices and directly affect our volume of distribution. Finally and above all else we are interested in the success and prosperity of the American farmer, for upon his ability to pay and his will to buy rests not only our own prosperity, but the prosperity of the nation.

As your chairman, therefore, I invite you to give your whole hearted consideration to the programme set before you. Let us not come to this meeting seeking to get as much as we can and give as little as we may, but let each of us throw our whole energy into this work to the end that our industry may be put on a higher and more profitable plane and let us always remember that whatever benefits one, benefits all.

The present is an opportune time for the tractor and thresher industry to take fresh hold on these questions and set them on the way to solution. We have just passed through two years of the worst depression ever known in the business history of the country, but at last the dawn of a new day is breaking, the sun is rising again in the East. 1922 was a little better than 1921 and 1923 gives promise of even greater improvement. During this period just past, farm prices and commodity prices have been out of joint. They are not yet wholly in accord, but while commodity prices are again going up, it is most heartening to observe that the prices of farm products are going up also and in a degree greater than most of us suspect. I wonder if we realize just how much better off financially the farmer is in the sale of his 1922 crop as compared with his 1921 crop. I have had prepared a comparative list of prices of farm commodities in primary markets as of the 14th day of November, 1921, and the 14th day of November, 1922.

This table brings strikingly to our attention the great outstanding fact that the financial condition of the farmer in America this year is very greatly improved over that of a year ago. The

prices in the table below are given by the Market Analysis Department of the American Farm Bureau and are Chicago quotations, except as noted. These are cash prices. If December future prices were taken, the ratio of increase is even greater.

	Nov. 14 1922	Nov. 14 1921	Pct. Inc. Dec.
Fat hogs.....	\$8.20	\$6.70	22.4
Beef steers.....	9.95	7.25	37.2
Fat lambs.....	14.25	8.80	61.9
Fat sheep.....	7.00	3.90	79.5
Wool (Boston) ..	.57	.35½	60.0
Butter .....	.48½	.44	9.2
Cheese .....	.24½	.20¼	20.9
Eggs .....	.51	.54	5.5
Poultry—hens ..	.18	.21½	16.2
Wheat, No. 2, hard	1.19%	1.11%	7.1
Corn, No. 2, mixed .....	.71½	.47%	49.2
Oats, No. 2, white .....	.44½	.35½	26.2
Rye, No. 2.....	.86%	.77	12.6
Barley .....	.64½	.53	21.7
Kaffir, No. 2 white (Kansas City) ..	1.74½	.87½	97.1
Hay, No. 1, Timothy	22.00	22.00	
Flax, No. 1 (Minn.)	2.51%	1.84	36.8
Cotton, middling (New York)...	.26	.17	52.9
Beans, white (Michigan)....	7.15	4.45	60.6
Potatoes .....	.85	1.90	55.2
Onions	1.70	4.75	64.2
Apples	5.00	8.00	37.5
Hides .....	.23	.15½	48.3
Sugar (N. Y.)...	.07	.052	34.6

These prices when read into seven principal crops of the United States for the respective years, 1922 and 1921, show an increase in value of the seven crops of wheat, corn, oats, cotton, flax, barley and kaffir of the stupendous sum of \$1,592,806,392. The respective gains for 1922 crop are as set out below:

Wheat	\$81,821,870
Corn	592,599,320
Oats	173,339,640
Cotton	641,460,000

Flax	15,538,187
Barley	46,572,065
Kaffir	41,475,310

\$1,592,806,392

While the corn crop for 1922 is 184,264,000 bushels less than in 1921, its value is \$592,599,320 more than in 1921.

It cannot be possible that such an enormous increase in the buying power of the farmer will fail to be reflected in the business of our industry for 1923.

Undoubtedly much of the improvement in farm prices is due to the greatly increased activity in our manufacturing industries with the resulting increased employment of that great body of laborers which constitutes the farmer's home market. We are, however, still an exporting country. Our farm prices therefore in great degree depend upon the European demand and the ability of the European buyer to satisfy that demand. The conditions of Europe agriculturally as recently set forth by Mr. Alfred P. Dennis of the United States Department of Commerce, present some interesting conclusions. The first and most outstanding one is that, eliminating Russia, about which none of us know anything, the human population of Europe for the decade ending 1921 as compared with the decade ending 1911, in spite of all the heavy war losses, shows a loss of only one-half of one per cent. There are therefore practically as many people to feed in Europe now as before the war.

Live stock, both meat and draft animals, have decreased in Europe from 10 to 40 per cent.; areas devoted to food products have all decreased. It must be borne in mind that so-called Western Europe cannot increase its production. Years ago these countries reached the maximum of their ability to produce food. For nearly a century their production has been the maximum per acre plan. The production in this country, as well as in Eastern Europe, Balkans and Russia, has always been the maximum per man plan. In those countries in Eastern Europe, and even including Poland, where prior to the war the land was held in great estates, it is now held in small parcels by peasants and small farmers who are unable to finance the necessary machinery and equipment to make the land produce as much as it did under the old regime. It is their Eastern Europe which has been relied upon largely to raise an exportable surplus for the West and industrialized countries to meet their demand for food, which largely exceeds their maximum ability to produce.

Some interesting figures have been presented by Broomhall, the grain statistician, from which it appears that the world's surplus for the year ending next July cannot exceed 680,000,000 bushels. In this estimate he considers the exportation of the United States at 224,000,000 bushels; Canada, 240,000,000; Argentine, 112,000,000; Australia, 56,000,000; India and others, 48,000,000. Broomhall then says that the crop outlook in importing countries indicates that more than this quantity will be required. This should make for a better price, if the importing countries are able to buy what they want

and need, and the only thing that will prevent it will be forced economy and the reintroduction of war time methods.

Another interesting conclusion reached by Mr. Dennis is that Russia and the other eastern countries of Europe cannot be expected to get back on a normal basis of production short of a whole generation.

The American farmer had no right to expect, and did not expect to see war prices for grain and farm products continue, but he did have the right to expect a better balancing of relations between farm prices and the prices of all other commodities. This balancing has been slow coming about, but it is even now on the way, and the present tendency seems to indicate that the balance is going to be secured by a very considerable improvement in the price of the things the farmer has to sell. In the meantime the farmer has devoted himself to the problem of reducing the cost of production and being able to sell his surplus profitably at a much lower figure than was possible during the period of high cost. It is obvious that his market would still be better, if we could consume all our surplus farm products at home, and not be dependent upon the ability of the foreign consumer to buy.

Notwithstanding the criticism of one of our most valued trade papers on the immigration resolution adopted by the National Association of Farm Equipment Manufacturers, I am firmly convinced that this resolution was and is sound. The present three per cent. immigration law does not improve the character of our immigrants and from this the republic suffers. The real reason for the three per cent. rule was not the improvement of American citizenship, as might be implied from the language of our critic, but was distinctly for the perpetuation of a monopoly of labor organized and controlled by Mr. Gompers and his associates.

There is a shortage of labor in this country and from this the farmer suffers, both from higher prices he must pay for the commodities he buys and from curtailment of his potential consuming public.

Our friendly critic claims that our industry "fell for" an inimical appeal presumably inspired by "those elements which bear the most watching." I am quite sure I voice the sentiments of our industry when I say that the National Association has fallen for neither any appeal nor any element. The resolution of the National Association carried just two recommendations:

One for the repeal of the three per cent. law. The other that immigration to this country be restricted only to consistent moral, physical and financial qualifications with provision for the termination of these facts prior to the departure of the alien from his native land.

And if we can read aright, this is exactly what our friendly critic himself urges in the concluding paragraph of his editorial. More than this it seems could not be asked, and the reason for mentioning it here is to give our friendly critic an opportunity to read again the

resolution and do justice to an industry which is not accustomed to being charged with associating with elements which bear the most watching.

I not only believe in more people in this country, but more things, more commodities of every kind. More citizens means more demands; more demands means more things out of life, a higher plane of living, more food to eat, more clothes to wear, more pleasures, more automobiles, if you please, and all this will mean more tractors; more and better farming machinery, for it means more production to meet these demands. These are the things which always distinguish civilization from barbarism, modern business from primitive barter.

Last week I saw an article in a New York paper calling attention to the fact that Iowa had one automobile for each five persons and that the whole state could go visiting on wheels at once, that Iowa spent more for automobiles than the total value of her corn and oats crop combined. Well what of it? Where did she spend it? Where did the money go? As a nation we have still got both the money and the automobiles. Let us say Michigan got the money and Iowa the automobiles; then when the corn and oats and hogs went from Iowa to Michigan, Iowa got back the money, and now has both the money and automobiles, and if Michigan could employ enough hands to eat Iowa's surplus, Iowa's prices would be still better because she would not have to depend upon the foreign demand and the ability of the foreigner to pay. Suppose Iowa did not buy any automobiles. Suppose she had no market for her surplus. Suppose Michigan had nothing for her workmen to do. The supposition carried to its obvious conclusion would lead to chaos. Russia is not buying any automobiles, yet Russia is starving. Mere money does not measure the wealth of a nation. A nation's wealth is measured by the things she has and the commerce she carries on. Mere population will not make a nation's wealth. If it did, India and China would be the wealthiest nations of the world.

The true measure of a nation's wealth is the enterprise of the people making up that population.

What we would like to see is such a home demand for the products of the farm as will require every farmer to produce three times as much as he is doing now and every acre to produce three times what it is producing now. This will not only mean more tractors, which alone can make such production possible, but more business of every kind; a more contented people, a more prosperous people, a higher civilization. And since we as manufacturers of these tools so essential to the nation's prosperity have this great possibility before us, let us carry on, let us be proud we are engaged in the world's most important economic work.

A medium size tractor with four plow bottom can turn 13 acres per day. The old hand plow and two horses could handle 2½ acres—not more.

Denver is the gateway to twelve national parks and thirty-two national monuments.

Mechanical Specifications of Motor Trucks—1922

REVISED EACH MONTH

[illegible]

TRADE NAME AND MODEL		Capacity, Pounds	Chassis Price	Wheel Base	Motor, Horse Power	Motor, Voltage	Motor, Amps	Motor, RPM	Motor, Type	Motor, Material	Motor, Finish	Motor, Weight	Motor, Dimensions	Motor, Notes
A & B	3T	6,000	42.76-2r	4 51 1/2	42.76-2r	4 51 1/2	42.76-2r	4 51 1/2	42.76-2r	4 51 1/2	42.76-2r	4 51 1/2	42.76-2r	4 51 1/2
A & B	3T	10,000	42.76-2r	4 51 1/2	42.76-2r	4 51 1/2	42.76-2r	4 51 1/2	42.76-2r	4 51 1/2	42.76-2r	4 51 1/2	42.76-2r	4 51 1/2
Acson	141	1,500	42.76-2r	4 51 1/2	42.76-2r	4 51 1/2	42.76-2r	4 51 1/2	42.76-2r	4 51 1/2	42.76-2r	4 51 1/2	42.76-2r	4 51 1/2
Acson	142	2,000	42.76-2r	4 51 1/2	42.76-2r	4 51 1/2	42.76-2r	4 51 1/2	42.76-2r	4 51 1/2	42.76-2r	4 51 1/2	42.76-2r	4 51 1/2
Acson	143	2,000	42.76-2r	4 51 1/2	42.76-2r	4 51 1/2	42.76-2r	4 51 1/2	42.76-2r	4 51 1/2	42.76-2r	4 51 1/2	42.76-2r	4 51 1/2
Acson	144	2,000	42.76-2r	4 51 1/2	42.76-2r	4 51 1/2	42.76-2r	4 51 1/2	42.76-2r	4 51 1/2	42.76-2r	4 51 1/2	42.76-2r	4 51 1/2
Acson	145	2,000	42.76-2r	4 51 1/2	42.76-2r	4 51 1/2	42.76-2r	4 51 1/2	42.76-2r	4 51 1/2	42.76-2r	4 51 1/2	42.76-2r	4 51 1/2
Acson	146	2,000	42.76-2r	4 51 1/2	42.76-2r	4 51 1/2	42.76-2r	4 51 1/2	42.76-2r	4 51 1/2	42.76-2r	4 51 1/2	42.76-2r	4 51 1/2
Acson	147	2,000	42.76-2r	4 51 1/2	42.76-2r	4 51 1/2	42.76-2r	4 51 1/2	42.76-2r	4 51 1/2	42.76-2r	4 51 1/2	42.76-2r	4 51 1/2
Acson	148	2,000	42.76-2r	4 51 1/2	42.76-2r	4 51 1/2	42.76-2r	4 51 1/2	42.76-2r	4 51 1/2	42.76-2r	4 51 1/2	42.76-2r	4 51 1/2
Acson	149	2,000	42.76-2r	4 51 1/2	42.76-2r	4 51 1/2	42.76-2r	4 51 1/2	42.76-2r	4 51 1/2	42.76-2r	4 51 1/2	42.76-2r	4 51 1/2
Acson	150	2,000	42.76-2r	4 51 1/2	42.76-2r	4 51 1/2	42.76-2r	4 51 1/2	42.76-2r	4 51 1/2	42.76-2r	4 51 1/2	42.76-2r	4 51 1/2
Acson	151	2,000	42.76-2r	4 51 1/2	42.76-2r	4 51 1/2	42.76-2r	4 51 1/2	42.76-2r	4 51 1/2	42.76-2r	4 51 1/2	42.76-2r	4 51 1/2
Acson	152	2,000	42.76-2r	4 51 1/2	42.76-2r	4 51 1/2	42.76-2r	4 51 1/2	42.76-2r	4 51 1/2	42.76-2r	4 51 1/2	42.76-2r	4 51 1/2
Acson	153	2,000	42.76-2r	4 51 1/2	42.76-2r	4 51 1/2	42.76-2r	4 51 1/2	42.76-2r	4 51 1/2	42.76-2r	4 51 1/2	42.76-2r	4 51 1/2
Acson	154	2,000	42.76-2r	4 51 1/2	42.76-2r	4 51 1/2	42.76-2r	4 51 1/2	42.76-2r	4 51 1/2	42.76-2r	4 51 1/2	42.76-2r	4 51 1/2
Acson	155	2,000	42.76-2r	4 51 1/2	42.76-2r	4 51 1/2	42.76-2r	4 51 1/2	42.76-2r	4 51 1/2	42.76-2r	4 51 1/2	42.76-2r	4 51 1/2
Acson	156	2,000	42.76-2r	4 51 1/2	42.76-2r	4 51 1/2	42.76-2r	4 51 1/2	42.76-2r	4 51 1/2	42.76-2r	4 51 1/2	42.76-2r	4 51 1/2
Acson	157	2,000	42.76-2r	4 51 1/2	42.76-2r	4 51 1/2	42.76-2r	4 51 1/2	42.76-2r	4 51 1/2	42.76-2r	4 51 1/2	42.76-2r	4 51 1/2
Acson	158	2,000	42.76-2r	4 51 1/2	42.76-2r	4 51 1/2	42.76-2r	4 51 1/2	42.76-2r	4 51 1/2	42.76-2r	4 51 1/2	42.76-2r	4 51 1/2
Acson	159	2,000	42.76-2r	4 51 1/2	42.76-2r	4 51 1/2	42.76-2r	4 51 1/2	42.76-2r	4 51 1/2	42.76-2r	4 51 1/2	42.76-2r	4 51 1/2
Acson	160	2,000	42.76-2r	4 51 1/2	42.76-2r	4 51 1/2	42.76-2r	4 51 1/2	42.76-2r	4 51 1/2	42.76-2r	4 51 1/2	42.76-2r	4 51 1/2
Acson	161	2,000	42.76-2r	4 51 1/2	42.76-2r	4 51 1/2	42.76-2r	4 51 1/2	42.76-2r	4 51 1/2	42.76-2r	4 51 1/2	42.76-2r	4 51 1/2
Acson	162	2,000	42.76-2r	4 51 1/2	42.76-2r	4 51 1/2	42.76-2r	4 51 1/2	42.76-2r	4 51 1/2	42.76-2r	4 51 1/2	42.76-2r	4 51 1/2
Acson	163	2,000	42.76-2r	4 51 1/2	42.76-2r	4 51 1/2	42.76-2r	4 51 1/2	42.76-2r	4 51 1/2	42.76-2r	4 51 1/2	42.76-2r	4 51 1/2
Acson	164	2,000	42.76-2r	4 51 1/2	42.76-2r	4 51 1/2	42.76-2r	4 51 1/2	42.76-2r	4 51 1/2	42.76-2r	4 51 1/2	42.76-2r	4 51 1/2
Acson	165	2,000	42.76-2r	4 51 1/2	42.76-2r	4 51 1/2	42.76-2r	4 51 1/2	42.76-2r	4 51 1/2	42.76-2r	4 51 1/2	42.76-2r	4 51 1/2
Acson	166	2,000	42.76-2r	4 51 1/2	42.76-2r	4 51 1/2	42.76-2r	4 51 1/2	42.76-2r	4 51 1/2	42.76-2r	4 51 1/2	42.76-2r	4 51 1/2
Acson	167	2,000	42.76-2r	4 51 1/2	42.76-2r	4 51 1/2	42.76-2r	4 51 1/2	42.76-2r	4 51 1/2	42.76-2r	4 51 1/2	42.76-2r	4 51 1/2
Acson	168	2,000	42.76-2r	4 51 1/2	42.76-2r	4 51 1/2	42.76-2r	4 51 1/2	42.76-2r	4 51 1/2	42.76-2r	4 51 1/2	42.76-2r	4 51 1/2
Acson	169	2,000	42.76-2r	4 51 1/2	42.76-2r	4 51 1/2	42.76-2r	4 51 1/2	42.76-2r	4 51 1/2	42.76-2r	4 51 1/2	42.76-2r	4 51 1/2
Acson	170	2,000	42.76-2r	4 51 1/2	42.76-2r	4 51 1/2	42.76-2r	4 51 1/2	42.76-2r	4 51 1/2	42.76-2r	4 51 1/2	42.76-2r	4 51 1/2
Acson	171	2,000	42.76-2r	4 51 1/2	42.76-2r	4 51 1/2	42.76-2r	4 51 1/2	42.76-2r	4 51 1/2	42.76-2r	4 51 1/2	42.76-2r	4 51 1/2
Acson	172	2,000	42.76-2r	4 51 1/2	42.76-2r	4 51 1/2	42.76-2r	4 51 1/2	42.76-2r	4 51 1/2	42.76-2r	4 51 1/2	42.76-2r	4 51 1/2
Acson	173	2,000	42.76-2r	4 51 1/2	42.76-2r	4 51 1/2	42.76-2r	4 51 1/2	42.76-2r	4 51 1/2	42.76-2r	4 51 1/2	42.76-2r	4 51 1/2
Acson	174	2,000	42.76-2r	4 51 1/2	42.76-2r	4 51 1/2	42.76-2r	4 51 1/2	42.76-2r	4 51 1/2	42.76-2r	4 51 1/2	42.76-2r	4 51 1/2
Acson	175	2,000	42.76-2r	4 51 1/2	42.76-2r	4 51 1/2	42.76-2r	4 51 1/2	42.76-2r	4 51 1/2	42.76-2r	4 51 1/2	42.76-2r	4 51 1/2
Acson	176	2,000	42.76-2r	4 51 1/2	42.76-2r	4 51 1/2	42.76-2r	4 51 1/2	42.76-2r	4 51 1/2	42.76-2r	4 51 1/2	42.76-2r	4 51 1/2
Acson	177	2,000	42.76-2r	4 51 1/2	42.76-2r	4 51 1/2	42.76-2r	4 51 1/2	42.76-2r	4 51 1/2	42.76-2r	4 51 1/2	42.76-2r	4 51 1/2
Acson	178	2,000	42.76-2r	4 51 1/2	42.76-2r	4 51 1/2	42.76-2r	4 51 1/2	42.76-2r	4 51 1/2	42.76-2r	4 51 1/2	42.76-2r	4 51 1/2
Acson	179	2,000	42.76-2r	4 51 1/2	42.76-2r	4 51 1/2	42.76-2r	4 51 1/2	42.76-2r	4 51 1/2	42.76-2r	4 51 1/2	42.76-2r	4 51 1/2
Acson	180	2,000	42.76-2r	4 51 1/2	42.76-2r	4 51 1/2	42.76-2r	4 51 1/2	42.76-2r	4 51 1/2	42.76-2r	4 51 1/2	42.76-2r	4 51 1/2
Acson	181	2,000	42.76-2r	4 51 1/2	42.76-2r	4 51 1/2	42.76-2r	4 51 1/2	42.76-2r	4 51 1/2	42.76-2r	4 51 1/2	42.76-2r	4 51 1/2
Acson	182	2,000	42.76-2r	4 51 1/2	42.76-2r	4 51 1/2	42.76-2r	4 51 1/2	42.76-2r	4 51 1/2	42.76-2r	4 51 1/2	42.76-2r	4 51 1/2
Acson	183	2,000	42.76-2r	4 51 1/2	42.76-2r	4 51 1/2	42.76-2r	4 51 1/2	42.76-2r	4 51 1/2	42.76-2r	4 51 1/2	42.76-2r	4 51 1/2
Acson	184	2,000	42.76-2r	4 51 1/2	42.76-2r	4 51 1/2	42.76-2r	4 51 1/2	42.76-2r	4 51 1/2	42.76-2r	4 51 1/2	42.76-2r	4 51 1/2
Acson	185	2,000	42.76-2r	4 51 1/2	42.76-2r	4 51 1/2	42.76-2r	4 51 1/2	42.76-2r	4 51 1/2	42.76-2r	4 51 1/2	42.76-2r	4 51 1/2
Acson	186	2,000	42.76-2r	4 51 1/2	42.76-2r	4 51 1/2	42.76-2r	4 51 1/2	42.76-2r	4 51 1/2	42.76-2r	4 51 1/2	42.76-2r	4 51 1/2
Acson	187	2,000	42.76-2r	4 51 1/2	42.76-2r	4 51 1/2	42.76-2r	4 51 1/2	42.76-2r	4 51 1/2	42.76-2r	4 51 1/2	42.76-2r	4 51 1/2
Acson	188	2,000	42.76-2r	4 51 1/2	42.76-2r	4 51 1/2	42.76-2r	4 51 1/2	42.76-2r	4 51 1/2	42.76-2r	4 51 1/2	42.76-2r	4 51 1/2
Acson	189	2,000	42.76-2r	4 51 1/2	42.76-2r	4 51 1/2	42.76-2r	4 51 1/2	42.76-2r	4 51 1/2	42.76-2r	4 51 1/2	42.76-2r	4 51 1/2
Acson	190	2,000	42.76-2r	4 51 1/2	42.76-2r	4 51 1/2	42.76-2r	4 51 1/2	42.76-2r	4 51 1/2	42.76-2r	4 51 1/2	42.76-2r	4 51 1/2
Acson	191	2,000	42.76-2r	4 51 1/2	42.76-2r	4 51 1/2	42.76-2r	4 51 1/2	42.76-2r	4 51 1/2	42.76-2r	4 51 1/2	42.76-2r	4 51 1/2
Acson	192	2,000	42.76-2r	4 51 1/2	42.76-2r	4 51 1/2	42.76-2r	4 51 1/2	42.76-2r	4 51 1/2	42.76-2r	4 51 1/2	42.76-2r	4 51 1/2
Acson	193	2,000	42.76-2r	4 51 1/2	42.76-2r	4 51 1/2	42.76-2r	4 51 1/2	42.76-2r	4 51 1/2	42.76-2r	4 51 1/2	42.76-2r	4 51 1/2
Acson	194	2,000	42.76-2r	4 51 1/2	42.76-2r	4 51 1/2	42.76-2r	4 51 1/2	42.76-2r	4 51 1/2	42.76-2r	4 51 1/2	42.76-2r	4 51 1/2
Acson	195	2,000	42.76-2r	4 51 1/2	42.76-2r	4 51 1/2	42.76-2r	4 51 1/2	42.76-2r	4 51 1/2	42.76-2r	4 51 1/2	42.76-2r	4 51 1/2
Acson	196	2,000	42.76-2r	4 51 1/2	42.76-2r	4 51 1/2	42.76-2r	4 51 1/2	42.76-2r	4 51 1/2	42.76-2r	4 51 1/2	42.76-2r	4 51 1/2
Acson	197	2,000	42.76-2r	4 51 1/2	42.76-2r	4 51 1/2	42.76-2r	4 51 1/2	42.76-2r	4 51 1/2	42.76-2r	4 51 1/2	42.76-2r	4 51 1/2
Acson	198	2,000	42.76-2r	4 51 1/2	42.76-2r	4 51 1/2	42.76-2r	4 51 1/2	42.76-2r	4 51 1/2	42.76-2r	4 51 1/2	42.76-2r	4 51 1/2
Acson	199	2,000	42.76-2r	4 51 1/2	42.76-2r	4 51 1/2	42.76-2r	4 51 1/2	42.76-2r	4 51 1/2	42.76-2r	4 51 1/2	42.76-2r	4 51 1/2
Acson	200	2,000	42.76-2r	4 51 1/2	42.76-2r	4 51 1/2	42.76-2r	4 51 1/2	42.76-2r	4 51 1/2	42.76-2r	4 51 1/2	42.76-2r	4 51 1/2

TRADE NAME AND MODEL	Capacity, Pounds	Chassis Price	Wheelbase	Frame Material	Make of Engine	No. Cylinders	Bore and Stroke in Inches	S. A. E. H. P.	ENGINE				Make of Governor	Make of Carburetor	GEARSET			Final Drive	Make of Rear Axle	Tires			RUNNING GEAR			Make	Extra Cost				
									Cylinders, How Cast	Width of Piston Ring Groove	Cooling System	Radiator Type			Ignition System Type and Spark Advance	Type	Location			Speeds	Total Gear Reduction in High	Type of Rear Axle	Size, Front	Size, Rear	No. of Spokes			Width of Spokes	Size of Flange	Hub	
Belmont	1,000	110	114	pr-s	Leroy	4	3 1/2 x 4 1/2	15.60	1 1/2	1 1/2	v-t	v-t	Conn	Pierce	Zenith	1	sel	u-m	6.50-1	int-g	Wise	f-f	33x4 1/2	33x4 1/2	14 1/2	1 1/2	4 1/2	4 1/2	4 1/2	West	
Belmont	2,000	124	124	pr-s	H S	4	3 1/2 x 3 3/4		1 1/2	1 1/2	v-t	v-t	Bosch	Pierce	Stumb	1	sel	u-m	6.50-1	int-g	Clark	f-f	34x3 1/2	34x3 1/2	12 1/4	1 1/2	4 1/2	4 1/2	4 1/2	West	
Belmont	4,000	144	144	pr-s	Cont	4	4 1/2 x 5 1/4		1 1/2	1 1/2	v-t	v-t	Bosch	Pierce	Stumb	1	sel	u-m	6.50-1	int-g	Clark	f-f	34x3 1/2	34x3 1/2	12 1/4	1 1/2	4 1/2	4 1/2	4 1/2	West	
Belmont	5,000	144	144	pr-s	Cont	4	4 1/2 x 5 1/4		1 1/2	1 1/2	v-t	v-t	Bosch	Pierce	Stumb	1	sel	u-m	6.50-1	int-g	Clark	f-f	34x3 1/2	34x3 1/2	12 1/4	1 1/2	4 1/2	4 1/2	4 1/2	West	
Belmont	7,000	144	144	pr-s	Cont	4	4 1/2 x 5 1/4		1 1/2	1 1/2	v-t	v-t	Bosch	Pierce	Stumb	1	sel	u-m	6.50-1	int-g	Clark	f-f	34x3 1/2	34x3 1/2	12 1/4	1 1/2	4 1/2	4 1/2	4 1/2	West	
Belmont	10,000	144	144	pr-s	Cont	4	4 1/2 x 5 1/4		1 1/2	1 1/2	v-t	v-t	Bosch	Pierce	Stumb	1	sel	u-m	6.50-1	int-g	Clark	f-f	34x3 1/2	34x3 1/2	12 1/4	1 1/2	4 1/2	4 1/2	4 1/2	West	
Bessmer	2,000	126	126	pr-s	Buda	4	3 1/2 x 5 1/4	21.20	1 1/2	1 1/2	v-t	v-t	Eism	Duplex	Zenith	1	sel	u-m	7.20-1	int-g	Russell	f-f	34x3 1/2	34x3 1/2	12 1/4	1 1/2	4 1/2	4 1/2	4 1/2	G & D	Yes
Bessmer	3,000	146	146	pr-s	Buda	4	3 1/2 x 5 1/4	22.50	1 1/2	1 1/2	v-t	v-t	Eism	Duplex	Zenith	1	sel	u-m	7.20-1	int-g	Russell	f-f	34x3 1/2	34x3 1/2	12 1/4	1 1/2	4 1/2	4 1/2	4 1/2	G & D	Yes
Bessmer	4,000	146	146	pr-s	Buda	4	3 1/2 x 5 1/4	22.50	1 1/2	1 1/2	v-t	v-t	Eism	Duplex	Zenith	1	sel	u-m	7.20-1	int-g	Russell	f-f	34x3 1/2	34x3 1/2	12 1/4	1 1/2	4 1/2	4 1/2	4 1/2	G & D	Yes
Bessmer	5,000	146	146	pr-s	Buda	4	3 1/2 x 5 1/4	22.50	1 1/2	1 1/2	v-t	v-t	Eism	Duplex	Zenith	1	sel	u-m	7.20-1	int-g	Russell	f-f	34x3 1/2	34x3 1/2	12 1/4	1 1/2	4 1/2	4 1/2	4 1/2	G & D	Yes
Bessmer	7,000	146	146	pr-s	Buda	4	3 1/2 x 5 1/4	22.50	1 1/2	1 1/2	v-t	v-t	Eism	Duplex	Zenith	1	sel	u-m	7.20-1	int-g	Russell	f-f	34x3 1/2	34x3 1/2	12 1/4	1 1/2	4 1/2	4 1/2	4 1/2	G & D	Yes
Bessmer	10,000	146	146	pr-s	Buda	4	3 1/2 x 5 1/4	22.50	1 1/2	1 1/2	v-t	v-t	Eism	Duplex	Zenith	1	sel	u-m	7.20-1	int-g	Russell	f-f	34x3 1/2	34x3 1/2	12 1/4	1 1/2	4 1/2	4 1/2	4 1/2	G & D	Yes
Big Four	2,000	124	124	pr-s	Buda	4	3 1/2 x 5 1/4	19.00	1 1/2	1 1/2	v-t	v-t	Conn	Pierce	Zenith	1	sel	u-m	7.00-1	int-g	Clark	f-f	34x3 1/2	34x3 1/2	12 1/4	1 1/2	4 1/2	4 1/2	4 1/2	Dyneto	none
Big Four	3,000	144	144	pr-s	Buda	4	3 1/2 x 5 1/4	19.61	1 1/2	1 1/2	v-t	v-t	Conn	Pierce	Zenith	1	sel	u-m	7.00-1	int-g	Clark	f-f	34x3 1/2	34x3 1/2	12 1/4	1 1/2	4 1/2	4 1/2	4 1/2	Dyneto	none
Big Four	4,000	144	144	pr-s	Buda	4	3 1/2 x 5 1/4	22.00	1 1/2	1 1/2	v-t	v-t	Conn	Pierce	Zenith	1	sel	u-m	7.00-1	int-g	Clark	f-f	34x3 1/2	34x3 1/2	12 1/4	1 1/2	4 1/2	4 1/2	4 1/2	Dyneto	none
Big Four	5,000	144	144	pr-s	Buda	4	3 1/2 x 5 1/4	22.00	1 1/2	1 1/2	v-t	v-t	Conn	Pierce	Zenith	1	sel	u-m	7.00-1	int-g	Clark	f-f	34x3 1/2	34x3 1/2	12 1/4	1 1/2	4 1/2	4 1/2	4 1/2	Dyneto	none
Big Four	7,000	144	144	pr-s	Buda	4	3 1/2 x 5 1/4	22.00	1 1/2	1 1/2	v-t	v-t	Conn	Pierce	Zenith	1	sel	u-m	7.00-1	int-g	Clark	f-f	34x3 1/2	34x3 1/2	12 1/4	1 1/2	4 1/2	4 1/2	4 1/2	Dyneto	none
Big Four	10,000	144	144	pr-s	Buda	4	3 1/2 x 5 1/4	22.00	1 1/2	1 1/2	v-t	v-t	Conn	Pierce	Zenith	1	sel	u-m	7.00-1	int-g	Clark	f-f	34x3 1/2	34x3 1/2	12 1/4	1 1/2	4 1/2	4 1/2	4 1/2	Dyneto	none
Birch	2,000	132	132	pr-s	Gray	4	3 1/2 x 5 1/4	19.60	1 1/2	1 1/2	v-t	v-t	Conn	Pierce	Zenith	1	sel	u-m	7.00-1	int-g	Clark	f-f	34x3 1/2	34x3 1/2	12 1/4	1 1/2	4 1/2	4 1/2	4 1/2	Dyneto	none
Birch	3,000	144	144	pr-s	Buda	4	3 1/2 x 5 1/4	22.00	1 1/2	1 1/2	v-t	v-t	Conn	Pierce	Zenith	1	sel	u-m	7.00-1	int-g	Clark	f-f	34x3 1/2	34x3 1/2	12 1/4	1 1/2	4 1/2	4 1/2	4 1/2	Dyneto	none
Birch	4,000	144	144	pr-s	Buda	4	3 1/2 x 5 1/4	22.00	1 1/2	1 1/2	v-t	v-t	Conn	Pierce	Zenith	1	sel	u-m	7.00-1	int-g	Clark	f-f	34x3 1/2	34x3 1/2	12 1/4	1 1/2	4 1/2	4 1/2	4 1/2	Dyneto	none
Birch	5,000	144	144	pr-s	Buda	4	3 1/2 x 5 1/4	22.00	1 1/2	1 1/2	v-t	v-t	Conn	Pierce	Zenith	1	sel	u-m	7.00-1	int-g	Clark	f-f	34x3 1/2	34x3 1/2	12 1/4	1 1/2	4 1/2	4 1/2	4 1/2	Dyneto	none
Birch	7,000	144	144	pr-s	Buda	4	3 1/2 x 5 1/4	22.00	1 1/2	1 1/2	v-t	v-t	Conn	Pierce	Zenith	1	sel	u-m	7.00-1	int-g	Clark	f-f	34x3 1/2	34x3 1/2	12 1/4	1 1/2	4 1/2	4 1/2	4 1/2	Dyneto	none
Birch	10,000	144	144	pr-s	Buda	4	3 1/2 x 5 1/4	22.00	1 1/2	1 1/2	v-t	v-t	Conn	Pierce	Zenith	1	sel	u-m	7.00-1	int-g	Clark	f-f	34x3 1/2	34x3 1/2	12 1/4	1 1/2	4 1/2	4 1/2	4 1/2	Dyneto	none
Brockway	2,000	135	135	pr-s	Cont	4	3 1/2 x 5 1/4	22.50	1 1/2	1 1/2	v-t	v-t	Conn	Pierce	Zenith	1	sel	u-m	7.00-1	int-g	Clark	f-f	34x3 1/2	34x3 1/2	12 1/4	1 1/2	4 1/2	4 1/2	4 1/2	Dyneto	none
Brockway	3,000	145	145	pr-s	Cont	4	3 1/2 x 5 1/4	22.50	1 1/2	1 1/2	v-t	v-t	Conn	Pierce	Zenith	1	sel	u-m	7.00-1	int-g	Clark	f-f	34x3 1/2	34x3 1/2	12 1/4	1 1/2	4 1/2	4 1/2	4 1/2	Dyneto	none
Brockway	4,000	145	145	pr-s	Cont	4	3 1/2 x 5 1/4	22.50	1 1/2	1 1/2	v-t	v-t	Conn	Pierce	Zenith	1	sel	u-m	7.00-1	int-g	Clark	f-f	34x3 1/2	34x3 1/2	12 1/4	1 1/2	4 1/2	4 1/2	4 1/2	Dyneto	none
Brockway	5,000	145	145	pr-s	Cont	4	3 1/2 x 5 1/4	22.50	1 1/2	1 1/2	v-t	v-t	Conn	Pierce	Zenith	1	sel	u-m	7.00-1	int-g	Clark	f-f	34x3 1/2	34x3 1/2	12 1/4	1 1/2	4 1/2	4 1/2	4 1/2	Dyneto	none
Brockway	7,000	145	145	pr-s	Cont	4	3 1/2 x 5 1/4	22.50	1 1/2	1 1/2	v-t	v-t	Conn	Pierce	Zenith	1	sel	u-m	7.00-1	int-g	Clark	f-f	34x3 1/2	34x3 1/2	12 1/4	1 1/2	4 1/2	4 1/2	4 1/2	Dyneto	none
Brockway	10,000	145	145	pr-s	Cont	4	3 1/2 x 5 1/4	22.50	1 1/2	1 1/2	v-t	v-t	Conn	Pierce	Zenith	1	sel	u-m	7.00-1	int-g	Clark	f-f	34x3 1/2	34x3 1/2	12 1/4	1 1/2	4 1/2	4 1/2	4 1/2	Dyneto	none
Buffalo	2,000	135	135	pr-s	Here	4	3 1/2 x 5 1/4	22.50	1 1/2	1 1/2	v-t	v-t	Conn	Pierce	Zenith	1	sel	u-m	7.00-1	int-g	Clark	f-f	34x3 1/2	34x3 1/2	12 1/4	1 1/2	4 1/2	4 1/2	4 1/2	Dyneto	none
Buffalo	3,000	144	144	pr-s	Wise	4	3 1/2 x 5 1/4	22.50	1 1/2	1 1/2	v-t	v-t	Conn	Pierce	Zenith	1	sel	u-m	7.00-1	int-g	Clark	f-f	34x3 1/2	34x3 1/2	12 1/4	1 1/2	4 1/2	4 1/2	4 1/2	Dyneto	none
Buffalo	4,000	144	144	pr-s	Wise	4	3 1/2 x 5 1/4	22.50	1 1/2	1 1/2	v-t	v-t	Conn	Pierce	Zenith	1	sel	u-m	7.00-1	int-g	Clark	f-f	34x3 1/2	34x3 1/2	12 1/4	1 1/2	4 1/2	4 1/2	4 1/2	Dyneto	none
Buffalo	5,000	144	144	pr-s	Wise	4	3 1/2 x 5 1/4	22.50	1 1/2	1 1/2	v-t	v-t	Conn	Pierce	Zenith	1	sel	u-m	7.00-1	int-g	Clark	f-f	34x3 1/2	34x3 1/2	12 1/4	1 1/2	4 1/2	4 1/2	4 1/2	Dyneto	none
Buffalo	7,000	144	144	pr-s	Wise	4	3 1/2 x 5 1/4	22.50	1 1/2	1 1/2	v-t	v-t	Conn	Pierce	Zenith	1	sel	u-m	7.00-1	int-g	Clark	f-f	34x3 1/2	34x3 1/2	12 1/4	1 1/2	4 1/2	4 1/2	4 1/2	Dyneto	none
Buffalo	10,000	144	144	pr-s	Wise	4	3 1/2 x 5 1/4	22.50	1 1/2	1 1/2	v-t	v-t	Conn	Pierce	Zenith	1	sel	u-m	7.00-1	int-g	Clark	f-f	34x3 1/2	34x34							

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TRADE NAME AND MODEL	ENGINE			GEARSET			RUNNING GEAR			STARTING & LIGHTING SYSTEM	
	Capacity, Pounds	Chassis Price	Wheels	Make of Governor	Make of Carburetor	Type of Fuel	Type of Lubricator	Type of Gear	Type of Drive	Type of Gear	Type of Drive
Handrickson	7,000	165	4	4 1/2 x 5 1/2	28 90	1/4	P	fan	fan	fan	fan
Handrickson	10,000	170	4	4 1/2 x 5 1/2	32 90	1/4	P	fan	fan	fan	fan
Handrickson	12,000	175	4	4 1/2 x 5 1/2	36 90	1/4	P	fan	fan	fan	fan
Handrickson	14,000	180	4	4 1/2 x 5 1/2	40 90	1/4	P	fan	fan	fan	fan
Handrickson	16,000	185	4	4 1/2 x 5 1/2	44 90	1/4	P	fan	fan	fan	fan
Handrickson	18,000	190	4	4 1/2 x 5 1/2	48 90	1/4	P	fan	fan	fan	fan
Handrickson	20,000	195	4	4 1/2 x 5 1/2	52 90	1/4	P	fan	fan	fan	fan
Handrickson	22,000	200	4	4 1/2 x 5 1/2	56 90	1/4	P	fan	fan	fan	fan
Handrickson	24,000	205	4	4 1/2 x 5 1/2	60 90	1/4	P	fan	fan	fan	fan
Handrickson	26,000	210	4	4 1/2 x 5 1/2	64 90	1/4	P	fan	fan	fan	fan
Handrickson	28,000	215	4	4 1/2 x 5 1/2	68 90	1/4	P	fan	fan	fan	fan
Handrickson	30,000	220	4	4 1/2 x 5 1/2	72 90	1/4	P	fan	fan	fan	fan
Handrickson	32,000	225	4	4 1/2 x 5 1/2	76 90	1/4	P	fan	fan	fan	fan
Handrickson	34,000	230	4	4 1/2 x 5 1/2	80 90	1/4	P	fan	fan	fan	fan
Handrickson	36,000	235	4	4 1/2 x 5 1/2	84 90	1/4	P	fan	fan	fan	fan
Handrickson	38,000	240	4	4 1/2 x 5 1/2	88 90	1/4	P	fan	fan	fan	fan
Handrickson	40,000	245	4	4 1/2 x 5 1/2	92 90	1/4	P	fan	fan	fan	fan
Handrickson	42,000	250	4	4 1/2 x 5 1/2	96 90	1/4	P	fan	fan	fan	fan
Handrickson	44,000	255	4	4 1/2 x 5 1/2	100 90	1/4	P	fan	fan	fan	fan
Handrickson	46,000	260	4	4 1/2 x 5 1/2	104 90	1/4	P	fan	fan	fan	fan
Handrickson	48,000	265	4	4 1/2 x 5 1/2	108 90	1/4	P	fan	fan	fan	fan
Handrickson	50,000	270	4	4 1/2 x 5 1/2	112 90	1/4	P	fan	fan	fan	fan
Handrickson	52,000	275	4	4 1/2 x 5 1/2	116 90	1/4	P	fan	fan	fan	fan
Handrickson	54,000	280	4	4 1/2 x 5 1/2	120 90	1/4	P	fan	fan	fan	fan
Handrickson	56,000	285	4	4 1/2 x 5 1/2	124 90	1/4	P	fan	fan	fan	fan
Handrickson	58,000	290	4	4 1/2 x 5 1/2	128 90	1/4	P	fan	fan	fan	fan
Handrickson	60,000	295	4	4 1/2 x 5 1/2	132 90	1/4	P	fan	fan	fan	fan
Handrickson	62,000	300	4	4 1/2 x 5 1/2	136 90	1/4	P	fan	fan	fan	fan
Handrickson	64,000	305	4	4 1/2 x 5 1/2	140 90	1/4	P	fan	fan	fan	fan
Handrickson	66,000	310	4	4 1/2 x 5 1/2	144 90	1/4	P	fan	fan	fan	fan
Handrickson	68,000	315	4	4 1/2 x 5 1/2	148 90	1/4	P	fan	fan	fan	fan
Handrickson	70,000	320	4	4 1/2 x 5 1/2	152 90	1/4	P	fan	fan	fan	fan
Handrickson	72,000	325	4	4 1/2 x 5 1/2	156 90	1/4	P	fan	fan	fan	fan
Handrickson	74,000	330	4	4 1/2 x 5 1/2	160 90	1/4	P	fan	fan	fan	fan
Handrickson	76,000	335	4	4 1/2 x 5 1/2	164 90	1/4	P	fan	fan	fan	fan
Handrickson	78,000	340	4	4 1/2 x 5 1/2	168 90	1/4	P	fan	fan	fan	fan
Handrickson	80,000	345	4	4 1/2 x 5 1/2	172 90	1/4	P	fan	fan	fan	fan
Handrickson	82,000	350	4	4 1/2 x 5 1/2	176 90	1/4	P	fan	fan	fan	fan
Handrickson	84,000	355	4	4 1/2 x 5 1/2	180 90	1/4	P	fan	fan	fan	fan
Handrickson	86,000	360	4	4 1/2 x 5 1/2	184 90	1/4	P	fan	fan	fan	fan
Handrickson	88,000	365	4	4 1/2 x 5 1/2	188 90	1/4	P	fan	fan	fan	fan
Handrickson	90,000	370	4	4 1/2 x 5 1/2	192 90	1/4	P	fan	fan	fan	fan
Handrickson	92,000	375	4	4 1/2 x 5 1/2	196 90	1/4	P	fan	fan	fan	fan
Handrickson	94,000	380	4	4 1/2 x 5 1/2	200 90	1/4	P	fan	fan	fan	fan
Handrickson	96,000	385	4	4 1/2 x 5 1/2	204 90	1/4	P	fan	fan	fan	fan
Handrickson	98,000	390	4	4 1/2 x 5 1/2	208 90	1/4	P	fan	fan	fan	fan
Handrickson	100,000	395	4	4 1/2 x 5 1/2	212 90	1/4	P	fan	fan	fan	fan
Handrickson	102,000	400	4	4 1/2 x 5 1/2	216 90	1/4	P	fan	fan	fan	fan
Handrickson	104,000	405	4	4 1/2 x 5 1/2	220 90	1/4	P	fan	fan	fan	fan
Handrickson	106,000	410	4	4 1/2 x 5 1/2	224 90	1/4	P	fan	fan	fan	fan
Handrickson	108,000	415	4	4 1/2 x 5 1/2	228 90	1/4	P	fan	fan	fan	fan
Handrickson	110,000	420	4	4 1/2 x 5 1/2	232 90	1/4	P	fan	fan	fan	fan
Handrickson	112,000	425	4	4 1/2 x 5 1/2	236 90	1/4	P	fan	fan	fan	fan
Handrickson	114,000	430	4	4 1/2 x 5 1/2	240 90	1/4	P	fan	fan	fan	fan
Handrickson	116,000	435	4	4 1/2 x 5 1/2	244 90	1/4	P	fan	fan	fan	fan
Handrickson	118,000	440	4	4 1/2 x 5 1/2	248 90	1/4	P	fan	fan	fan	fan
Handrickson	120,000	445	4	4 1/2 x 5 1/2	252 90	1/4	P	fan	fan	fan	fan
Handrickson	122,000	450	4	4 1/2 x 5 1/2	256 90	1/4	P	fan	fan	fan	fan
Handrickson	124,000	455	4	4 1/2 x 5 1/2	260 90	1/4	P	fan	fan	fan	fan
Handrickson	126,000	460	4	4 1/2 x 5 1/2	264 90	1/4	P	fan	fan	fan	fan
Handrickson	128,000	465	4	4 1/2 x 5 1/2	268 90	1/4	P	fan	fan	fan	fan
Handrickson	130,000	470	4	4 1/2 x 5 1/2	272 90	1/4	P	fan	fan	fan	fan
Handrickson	132,000	475	4	4 1/2 x 5 1/2	276 90	1/4	P	fan	fan	fan	fan
Handrickson	134,000	480	4	4 1/2 x 5 1/2	280 90	1/4	P	fan	fan	fan	fan
Handrickson	136,000	485	4	4 1/2 x 5 1/2	284 90	1/4	P	fan	fan	fan	fan
Handrickson	138,000	490	4	4 1/2 x 5 1/2	288 90	1/4	P	fan	fan	fan	fan
Handrickson	140,000	495	4	4 1/2 x 5 1/2	292 90	1/4	P	fan	fan	fan	fan
Handrickson	142,000	500	4	4 1/2 x 5 1/2	296 90	1/4	P	fan	fan	fan	fan
Handrickson	144,000	505	4	4 1/2 x 5 1/2	300 90	1/4	P	fan	fan	fan	fan
Handrickson	146,000	510	4	4 1/2 x 5 1/2	304 90	1/4	P	fan	fan	fan	fan
Handrickson	148,000	515	4	4 1/2 x 5 1/2	308 90	1/4	P	fan	fan	fan	fan
Handrickson	150,000	520	4	4 1/2 x 5 1/2	312 90	1/4	P	fan	fan	fan	fan
Handrickson	152,000	525	4	4 1/2 x 5 1/2	316 90	1/4	P	fan	fan	fan	fan
Handrickson	154,000	530	4	4 1/2 x 5 1/2	320 90	1/4	P	fan	fan	fan	fan
Handrickson	156,000	535	4	4 1/2 x 5 1/2	324 90	1/4	P	fan	fan	fan	fan
Handrickson	158,000	540	4	4 1/2 x 5 1/2	328 90	1/4	P	fan	fan	fan	fan
Handrickson	160,000	545	4	4 1/2 x 5 1/2	332 90	1/4	P	fan	fan	fan	fan
Handrickson	162,000	550	4	4 1/2 x 5 1/2	336 90	1/4	P	fan	fan	fan	fan
Handrickson	164,000	555	4	4 1/2 x 5 1/2	340 90	1/4	P	fan	fan	fan	fan
Handrickson	166,000	560	4	4 1/2 x 5 1/2	344 90	1/4	P	fan	fan	fan	fan
Handrickson	168,000	565	4	4 1/2 x 5 1/2	348 90	1/4	P	fan	fan	fan	fan
Handrickson	170,000	570	4	4 1/2 x 5 1/2	352 90	1/4	P	fan	fan	fan	fan
Handrickson	172,000	575	4	4 1/2 x 5 1/2	356 90	1/4	P	fan	fan	fan	fan
Handrickson	174,000	580	4	4 1/2 x 5 1/2	360 90	1/4	P	fan	fan	fan	fan
Handrickson	176,000	585	4	4 1/2 x 5 1/2	364 90	1/4	P	fan	fan	fan	fan
Handrickson	178,000	590	4	4 1/2 x 5 1/2	368 90	1/4	P	fan	fan	fan	fan
Handrickson	180,000	595	4	4 1/2 x 5 1/2	372 90	1/4	P	fan	fan	fan	fan
Handrickson	182,000	600	4	4 1/2 x 5 1/2	376 90	1/4	P	fan	fan	fan	fan
Handrickson	184,000	605	4	4 1/2 x 5 1/2	380 90	1/4	P	fan	fan	fan	fan
Handrickson	186,000	610	4	4 1/2 x 5 1/2	384 90	1/4	P	fan	fan	fan	fan
Handrickson	188,000	615	4	4 1/2 x 5 1/2	388 90	1/4	P	fan	fan	fan	fan
Handrickson	190,000	620	4	4 1/2 x 5 1/2	392 90	1/4	P	fan	fan	fan	fan
Handrickson	192,000	625	4	4 1/2 x 5 1/2	396 90	1/4	P	fan	fan	fan	fan
Handrickson	194,000	630	4	4 1/2 x 5 1/2	400 90	1/4	P	fan	fan	fan	fan
Handrickson	196,000	635	4	4 1/2 x 5 1/2	404 90	1/4	P	fan	fan	fan	fan
Handrickson	198,000	640	4	4 1/2 x 5 1/2	408 90	1/4	P	fan	fan	fan	fan
Handrickson	200,000	645	4	4 1/2 x 5 1/2	412 90	1/4	P	fan	fan	fan	fan
Handrickson	202,000	650	4	4 1/2 x 5 1/2	416 90	1/4	P	fan	fan	fan	fan
Handrickson	204,000	655	4	4 1/2 x 5 1/2	420 90	1/4	P	fan	fan	fan	fan
Handrickson	206,000	660	4	4 1/2 x 5 1/2	424 90	1/4	P	fan	fan	fan	fan
Handrickson	208,000	665	4	4 1/2 x 5 1/2	428 90	1/4	P	fan	fan	fan	fan
Handrickson	210,000	670	4	4 1/2 x 5 1/2	432 90	1/4	P	fan	fan	fan	fan
Handrickson	212,000	675	4	4 1/2 x 5 1/2	436 90	1/4	P	fan	fan	fan	fan
Handrickson	214,000	680	4	4 1/2 x 5 1/2	440 90	1/4	P	fan	fan	fan	fan
Handrickson	216,000	685	4	4 1/2 x 5 1/2	444 90	1/4	P	fan	fan	fan	fan
Handrickson	218,000	690	4	4 1/2 x 5 1/2	448 90	1/4	P	fan	fan	fan	fan
Handrickson	220,000	695	4	4 1/2 x 5 1/2	452 90	1/4	P	fan	fan	fan	fan
Handrickson	222,000	700	4	4 1/2 x 5 1/2	456 90	1/4	P	fan	fan	fan	fan
Handrickson	224,000	705	4	4 1/2 x 5 1/2	460 90	1/4	P	fan	fan	fan	fan
Handrickson	226,000	710	4	4 1/2 x 5 1/2	464 90	1/4	P	fan	fan	fan	fan
Handrickson	228,000	715	4	4 1/2 x 5 1/2	468 90	1/4	P	fan	fan	fan	fan
Handrickson	230,000	720	4	4 1/2 x 5 1/2	472 90	1/4	P	fan	fan	fan	fan
Handrickson	232,000	725	4	4 1/2 x 5 1/2	476 90	1/4	P	fan	fan	fan	fan
Handrickson	234,000	730	4	4 1/2 x 5 1/2	480 90	1/4	P	fan	fan	fan	fan
Handrickson	236,000	735	4	4 1/2 x 5 1/2	484 90	1/4	P	fan	fan	fan	fan
Handrickson	238,000	740	4	4 1/2 x 5 1/2	488 90	1/4	P	fan	fan	fan	fan
Handrickson	240,000	745	4	4 1/2 x 5 1/2	492 90	1/4	P	fan	fan	fan	fan
Handrickson	242,000	750	4	4 1/2 x 5 1/2	496 90	1/4	P	fan	fan	fan	fan
Handrickson	244,000	755	4	4 1/2 x 5 1/2							

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TRADE NAME AND MODEL	ENGINE				GEARSET				RUNNING GEAR				STARTING & LIGHTING SYSTEM																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																														
	Capacity, Pounds	Chassis Price	Wheelbase	Frame Material	Make of Engine	No. Cylinders	Bore and Stroke in Inches	S. A. E. H. P.	Cylinders, How Cast and Valve Location	Cooling System	Ignition System Type and Spark Advance	Make of Governor	Make of Carburetor	Clutch Type	GEARSET		WHEELS				Make	Extra Cost																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																					
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HIGHWAY TRANSPORT BUSINESS NEEDS 4000 TRAINED MEN.

SYRACUSE, N. Y., Dec. 19.—Speaking today before the students of Syracuse University, F. W. Fenn, secretary, National Motor Truck Committee, National Automobile Chamber of Commerce of New York, pointed out that careful estimates show that 4000 specially trained men will be needed in the next few years for service in the motor transport business, particularly traffic experts, to be attached to state, county and municipal organizations.

"The significance of this need will be readily appreciated when it is realized that over 1,430,000,000 tons of freight, including 134,400,000 tons of farm products, are now carried over our highways every year," remarked Mr. Fenn in the course of his address.

“The reason for these increased demands on highway transport is that shippers in general are beginning to appreciate the fact that in proportion as they relieve the railroads of less-than-carload shipments will the railroads be able to render them more efficient and cheaper service on their long-haul consignments.

"For there has come about pretty general agreement among railroad officials that truck transportation can be substituted for railroad operation in short-branch line service, in trap car work, and in terminal and suburban distribution.

"In Cincinnati alone the use of trucks in the interchange of freight between the railroads there has resulted in the elimination of 300,000 switching cuts, the release of over 66,000 freight cars and the advancement of the railroad freight movement 52 hours.

“All this work incident to the realignment of transportation facilities to meet the new demands of commerce is going to need young men who have had training in railway and motor truck economics and operating principles.

"In short, the university man of today is challenged to prepare himself for a new type of transportation service that is not only going to mean relief to the railroads, but prosperity to our country."

MOTOR TRUCK IN CHINA.

The cost of operation of a motor truck in China, as reported to the Automotive Division of the Department of Commerce, is 5.6 gold per ton mile. The costs were estimated by the representative of a large American tire concern in China on a basis of a truck costing \$4637 to the consumer in China. Depreciation charges were based on a five-year service of 50,000 miles; operation costs were based on fifty miles per day with a five-ton load; fixed costs were based on 300 days per year; tires were estimated at 10,000 miles.

Although no allowance was made for the construction and maintenance of roads in this statement, except for the \$50 license fee, it is considered to be a very reliable estimate.

The Swedish Agricultural-Machinery Industry

(Assistant Trade Commissioner H. Sorensen, Copenhagen, Denmark, in Commerce Reports.)

SEVERAL Swedish industries have become important factors in both domestic and foreign markets during the last 15 years as a result of the industrialization process through which the country has been passing. The manufacture of agricultural implements and machinery is one of the industries which has become increasingly important during this period. The Swedish market for such articles is an important one to American

manufacturers of agricultural implements, as Sweden is frequently a large purchaser of their products. With this fact in mind, and also the fact that such large potential markets as those of Russia, Finland, the Baltic countries, and Poland, are situated in close proximity to Sweden, it is manifest that the development of Sweden's agricultural-implement industry is a matter of considerable importance to the American manufacturer.

THE Swedish agricultural-machinery industry embraces about 75 concerns, most of which, however, are comparatively small. Most of the plants are located in central Sweden on the main lines of transportation and within easy reach of raw materials and water power, which is taken from the falls in northern and central Sweden. The main ports for export of machinery are Norrköping and Göteborg—the first located a little south of Stockholm on the Baltic sea and the other in western Sweden on the Cattegat. Foreign capital has played a very small part in the financing of the industry, although American capital is interested in one enterprise, and it is believed that Russian and German capital is interested in several of the larger concerns, but not in any controlling proportion.

Types of Implements and Machinery Manufactured in Sweden.

Agricultural implements and machinery manufactured in Sweden include nearly all types, from complete threshing outfits to the smallest garden cultivators. The principal ones manufactured, however, are threshers, harvesters, mowing machines, harrows, plows, seeders, tractors and dairy machinery.

The Swedish thresher is manufactured chiefly for domestic and near by markets. It is much smaller than foreign-built machines and differs also from foreign makes in that it does not mutilate the straw, this being important because of the straw's greater feeding value. In addition, the Swedish thresher sorts the grain in three qualities, according to the size of the grain, and is, on the whole, especially adapted for the home and neighboring markets. The "shell" of the Swedish thresher is usually made of wood instead of plate.

Harvesters and mowers are manufactured both for domestic use and for export, and are second only to separators as an article of export. None of the types manufactured differ greatly from well known American harvesters and mowers. Harrows, cultivators and similar implements are manufactured in large numbers, but principally for the domestic market. Swedish manufacturers of such implements pay particular attention to the tastes and needs of Swedish users, and, as a result, although imports have lately increased, the Swedish market for harrows and cultivators is still supplied principally by the domestic industry.

Swedish made plows have not made any decided headway in the domestic market nor in foreign markets. American plows are very popular and have a surprisingly wide use in Sweden. It is estimated that from 80 to 90 per cent. of the plows in use are of American make. The Swedish farmer has no hesitation in expressing his preference for the different American makes of plows, and one American plow in particular enjoys especial favor.

Small Swedish plows, with single and double moldboards, for subsoiling, are exported, chiefly to Finland, Denmark and the Baltic states, but apparently they are not able to hold their own against American plows.

American and German Tractors Preferred in Sweden.

Swedish tractors are not popular either in the domestic or foreign markets. The reason for this appears to be that Swedish tractor manufacturers have failed to keep up with the modern improvements in tractors and have continued to make very large and heavy machines, which are poorly adapted for the country. The Swedish makers of tractors continued to make oil-burning machines long after it had become evident that gasoline burning machines were the best. Consequently, sales of Swedish tractors, both in the home market and abroad, have dwindled to very small figures, and it is tacitly admitted by Swedish manufacturers that they cannot compete with the better American and cheaper German tractors.

The very heavy types predominate in Swedish manufacture. Very few of the track-laying type are made. The principal Swedish tractors now on the market are "Munktell," manufactured by the Munktells Mek Verkstads Nya Aktiebolag, Eskilstuna; "Advance," manufactured by A. B. Westmannland, and "June" and "Virso," made by the Jonköping Mek. Verksstad and the Virso Bruks Aktiebolaget, respectively.

Several well known American makes of tractors are sold in Sweden, and the American tractor, like the American plow, is very popular and is making excellent progress, despite generally depressed conditions and severe competition from other imported tractors, principally German. Competition from Germany is now declining rapidly, owing largely to poor quality, uncertainty of delivery, fluctuating prices and inability to supply parts.

The Swedish tractor market offers very promising prospects, not only for agricultural purposes, but also for lumber hauling and mining purposes. Although formerly only wheel type tractors were in demand, the track-laying type is now coming into favor, especially for lumber hauling purposes. Wheel tractors, when used for lumber hauling, are usually provided with large clogs to give greater gripping ability on uneven ground. Gasoline is preferred as fuel, as it is considered more economical.

The Swedish tractor industry appears to be in dire straits, from which it is hardly likely that it will be able to recover, and this, with decreasing German competition, offers an exceptional opportunity in Sweden and neighboring countries for American tractors, which have previously been supplied largely by Swedish manufacturers.

Sweden Leads in Supplying Dairy Machinery.

The dairy machinery industry, because of its great importance, will be discussed separately in a later report. For the present it is sufficient to say that in this field Sweden has outdistanced all competitors. Swedish separators, as well as milking and dairy machinery, are known the world over for their excellence, and find a ready market in practically every country where such machinery is used to any great extent.

The chief producers of this type of machinery are A.-B. Separator, Stockholm; A.-B. Baltic, Stockholm; and A.-B. Pump-Separator. Many small concerns manufacture various types of small separators and pumps. The popularity of Swedish dairy machinery may be ascribed to its simple and substantial construction and, in the case of separators, to superior skimming ability. The early start which this Swedish industry obtained undoubtedly played a determining part in the world-wide success of that country's industry.

(For the benefit of those who desire more detailed information regarding Swedish implement manufacturers, a list has been compiled giving the names and location of the more important plants, the principal types of machinery manufactured in each, the number of workmen employed, the value of the yearly output, and the capitalization of each firm. Copies of this list will be furnished by the Agricultural Implements Division on request.)

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